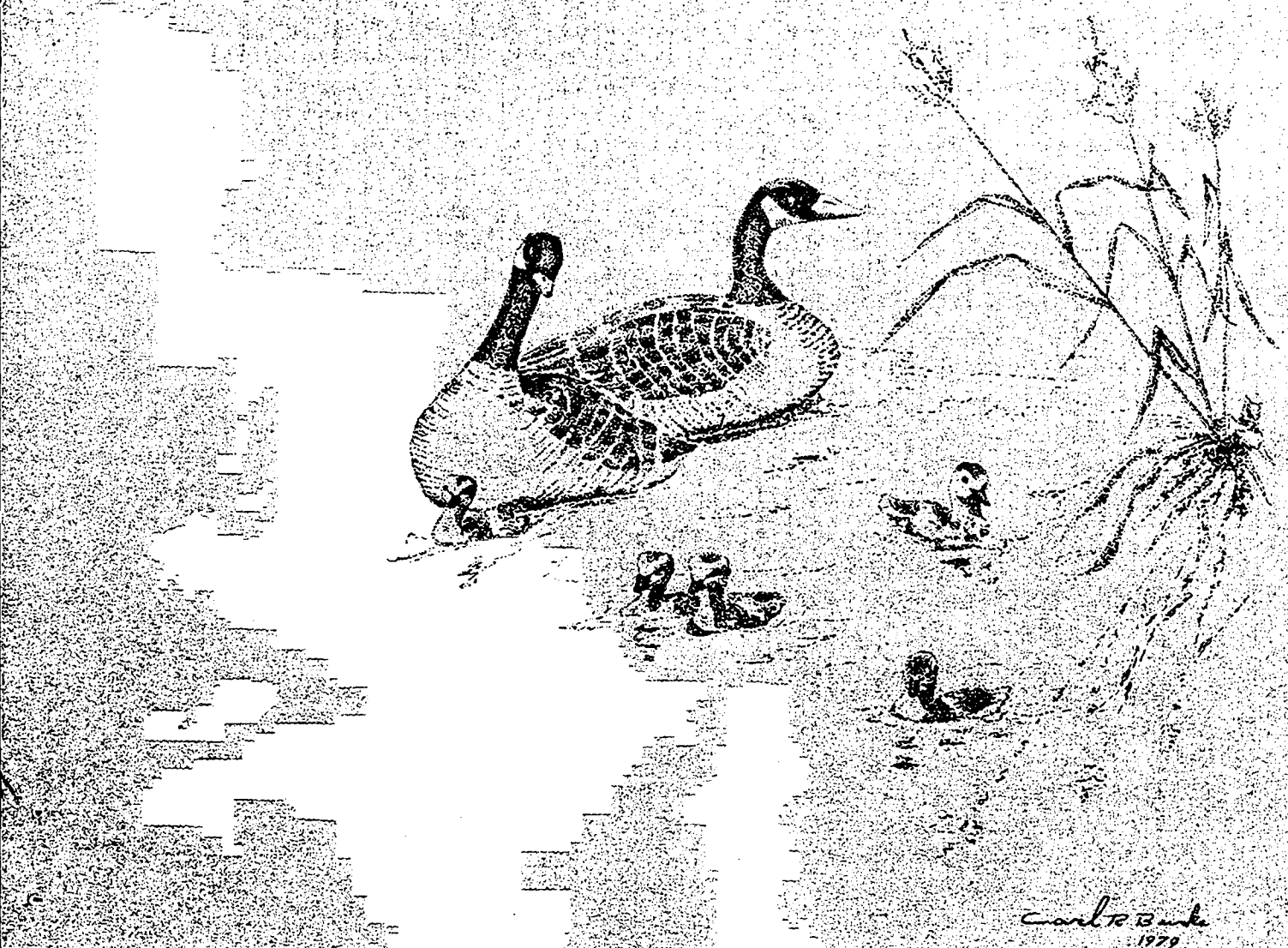
PLANT ASSOCIATIONS

OF THE FREMONT NATIONAL FOREST



JUNE '79
Forest Service USDA
Pacific Northwest Region
R6-Ecol-79-004

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OF THE

FREMONT NATIONAL FOREST

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JUNE 1979

USDA
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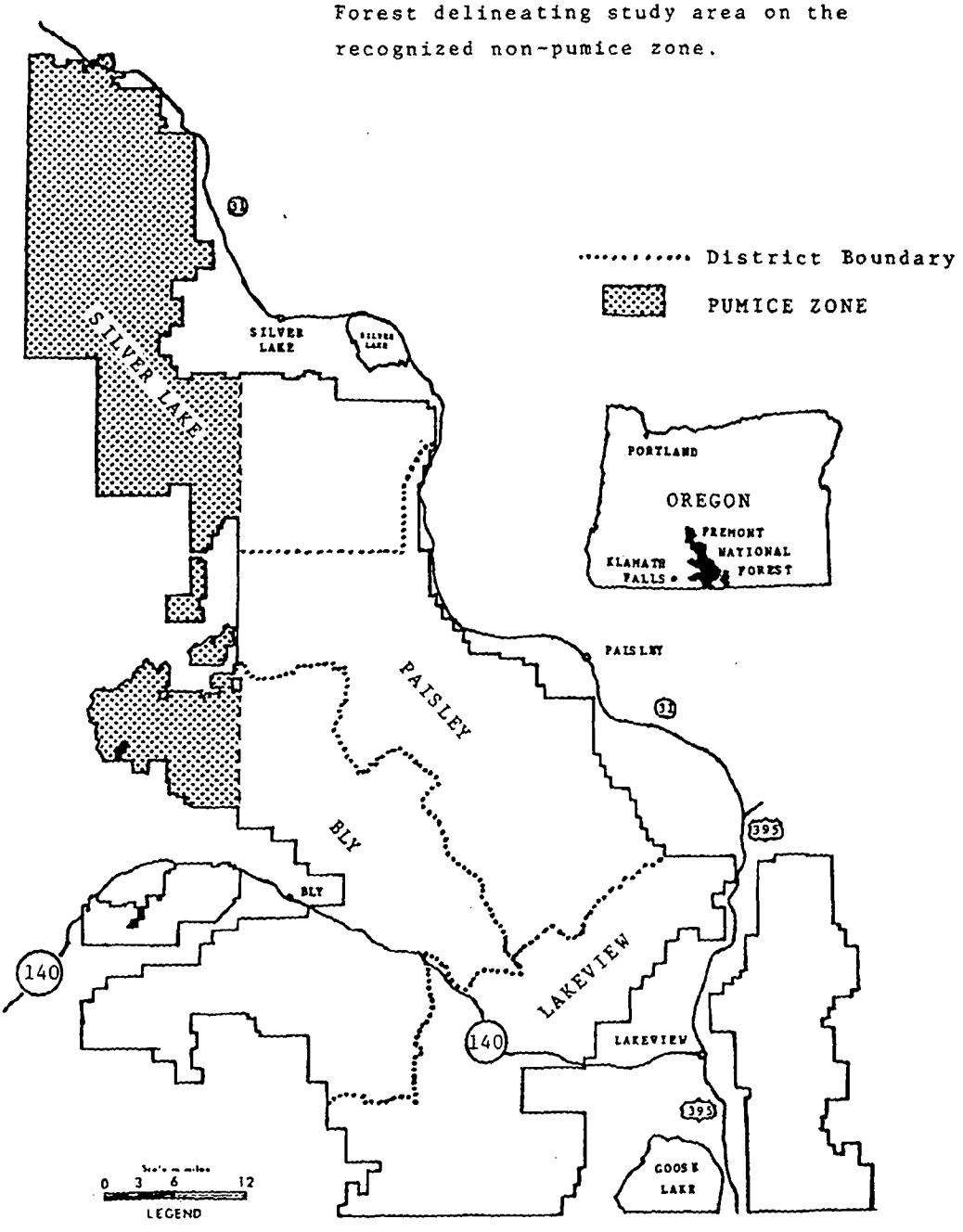
FREMONT NATIONAL FOREST

Map 1. Map of the Fremont National Forest delineating study area on the recognized non-pumice zone.



INTRODUCTION

GENERAL DISCUSSION

The Fremont National Forest contains a total of 1,198,000 acres. Approximately 940,000 acres were inventoried for naturally occurring plant communities. The 18 forested and 9 non-forested plant communities described in this paper occur on that part of the Forest considered as the nonpumice zone and lie essentially southeast of the zone of heavy pumice deposition as described by Volland (1976). (See map.)

The Fremont National Forest exhibits a wide range of plant communities. A variety of environmental conditions exist resulting in the biological diversity found on the Forest. The area is characterized by fault-block mountains that enclose basins having internal drainage. Some of the Forest may be described as generally mountainous with broad "U-shaped" valleys. A mantle of pumice has been aerially deposited on the western side of the Forest. Plant community development and dynamics have been greatly modified on these soils. Moving eastward and away from the zone of pumice deposition, average elevation increases and the valley floors are somewhat narrowed. Plant communities change from a single tree species dominance on the pumice to a pattern of associated coniferous forested stands. The Fremont National Forest is made up of essentially two separate mountainous areas: the Warner Mountains on the extreme eastern part of the Forest and a second series of mountains found between Lakeview, Oregon and Klamath Falls, Oregon. Outstanding geological and biological areas include Abert Rim which rises nearly 2500 feet above the Chewaucan Valley floor; an extinct dome shaped volcano, Slide Mountain, rises to a height in excess of 8000 feet; and Gearhart Mountain Wilderness, found north of Bly, Oregon, is noted as one of the most rugged and highest forested areas in extreme south central Oregon.

Past selective logging and aggressive fire control have complicated the attainment of a complete understanding of community development and the importance of natural species on any given site. A vast majority of stands now have a heavy understory component of white fir seedlings and saplings. Under a regime of naturally occurring wildfires, most of these stands were maintained in a "pure" ponderosa pine community.

CLASSIFICATION CONCEPT

Plant communities have been classified by one of two philosophies: the continuum or the discrete community (habitat type). A continuum in environment and climax vegetation as described by Hall (1970), has been assumed. Sampling was designed to encompass variability in soil, elevation, topography, climate and vegetation (Table 1). This approach provides the required data base for statistical analysis of vegetative response to its environment.

Plant communities were grouped into "plant community types" to facilitate land management guidelines related to tree stockability, silviculture, successional patterns, and vegetative mapping. The following criteria had to be met before being classified as a community type: (1) the type differs from all other types in land management limitations and opportunities; (2) the type can be recognized on the ground in any stage of disturbance; (3) the type should have limited variability in species composition; and (4) the type should have limited variability in productivity.

Plant community types found in the study area can be readily identified in the field approximately 70 percent of the time. The interface between communities is often very subtle and difficult to distinguish because of localized climatic and edaphic gradients. When "mixed types" are encountered the land manager is encouraged to form a decision based on management needs.

COMMUNITY DESCRIPTION CODES AND CRITERIA

Community Name: Each community type is given a name representative of important tree(s), shrubs, and herbaceous plants commonly found in that community. In some cases the shrub or herbaceous lifeform may be omitted; e.g., lodgepole pine/strawberry-fescue. A slash (/) in the community title separates species of different lifeform while a dash (-) separates species of similar lifeform.

Taxonomic Nomenclature and Authority: Common names are used exclusively throughout the community descriptions with the exception of some pathogens listed by proper scientific name. All common names and scientific names are listed in the species list. (See Appendix.) Taxonomic authority for scientific names is Hitchcock et al. (1955-69), Hitchcock and Cronquist (1973), and Peck (1961). Common names follow Garrison et al. (1976), Hitchcock and Cronquist (1973), and occasionally Peck (1961).

Environment and Soils: Notations are given in feet and inches; values that occur outside the usual range of data are noted in ( ). Hydrophobic is defined as the ability to resist wetting.

Vegetation: Dominants are those plants expressed by percent crown cover, characteristically dominating the community under good range conditions (ground vegetation) and those trees which most commonly dominate under average, unlogged stand conditions. Average stand conditions do not always represent climax forest dominants; note plant status in the "Status" column.

Constancy: Constancy is defined as the number of plots containing a given species and does not consider size or abundance of plants.

Status:[1] A **decreaser** is a plant so palatable or site sensitive that it is the first plant to decrease under excessive grazing or site disturbance. An **increaser** is a plant either low in palatability or insensitive to excessive grazing or site disturbance. The decreaser-increaser designation is used exclusively for shrubs and herbaceous plants. Trees are designated as either seral (successional) or climax depending upon their ability to successfully regenerate themselves under minimum stand disturbance. Seral species are the most aggressive in occupying an area following any disturbance; however, their regeneration potential declines as environmental conditions begin to stabilize to prevailing climatic and edaphic norms. Major-minor suggests the relative dominance of the species in a stabilized climax state; major implies the stand dominant, and minor refers to a subordinate or weak codominant status. Key indicator species may be absent in stands that have a closed canopy in which case openings or roadsides should be used as reference areas for determining plant community type.

Productivity (forested type): Site Index (SI) is based on average height of dominants at age 100 for ponderosa pine (PP),white fir (WF), sugar pine (SP), western white pine (WWP), incense cedar (IC), whitebark pine (WBP), and lodgepole pine (LP). Refer to literature cited for source of site index tables. TBA is total basal area of each species within the stand and is measured in square feet/acre. GBA (growth basal area) is the basal area at which crop tree(s) grow at 20 rings per inch at diameter breast height.

Ft^3/yr. Index is a relative measure of cubic volume for the community which may not be realized under management. The equation SI/10 X GBA/10 X 0.55 is derived for ponderosa pine by F. C. Hall (1973). The equation was applied to all trees species in this investigation.

It must be impressed upon the land manager that the cubic volume associated with each community type is merely a relative estimate of site potential. Furthermore, a majority of the community types recognized in this paper are mixed conifer and the productivity data displayed assumes a common basal area relationship in determining total basal area; e.g., 100 sq. ft. basal area white fir and 50 sq. ft. basal area for ponderosa pine in the same community was viewed as a total of 150 sq. ft. basal area per species when calculating GBA and cubic volume productivity. Mean is the average for the type. Five percent CI is the confidence interval at the 95 percent probability level; i.e., a mean site index value of 82 and 5 percent CI of 8 suggests a stand within that community type can have a site index value between 74 and 90 or 82 ± 8, 95 times out of 100. The 5 percent CI figure is strongly affected by sample size. In some cases the data base is either too small or variable to compute a meaningful 5 percent CI.

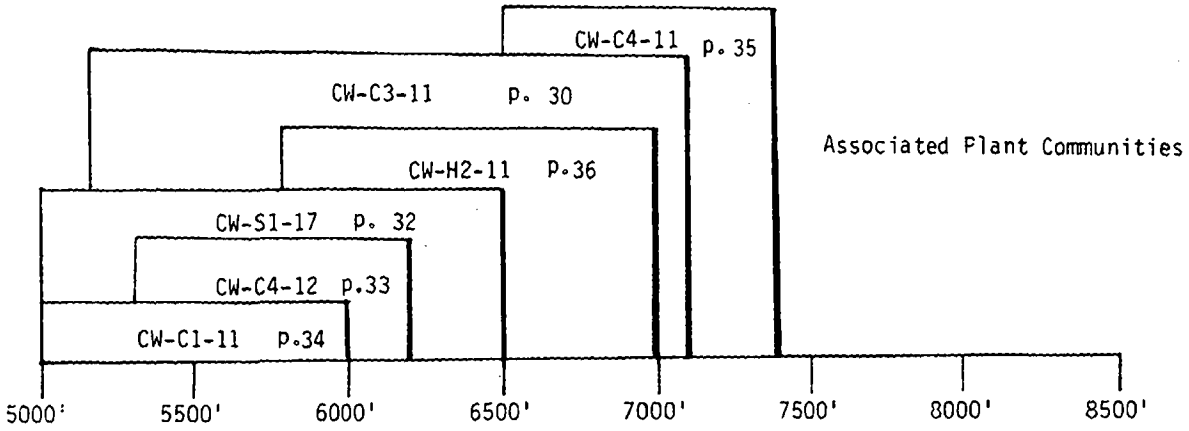
[1] Kenneth E. Neiman, Range Conservationist, US Forest Service, assisted in collection and analysis of both forest and non-forest community data.

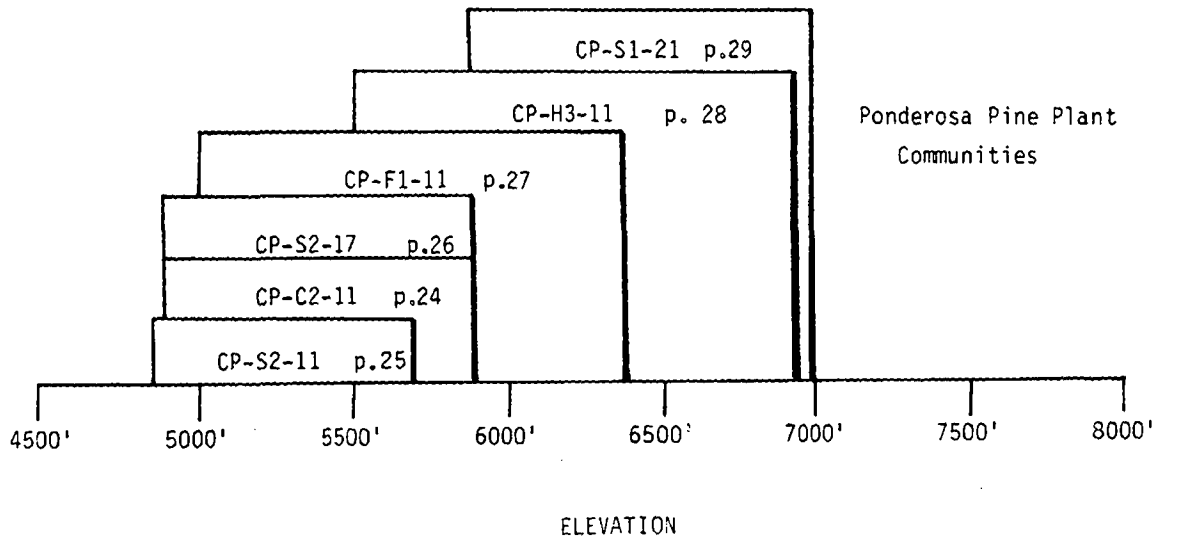
Site productivity is divided into five qualitative classes depending upon variation of mean cubic feet per year index across all communities: **Low** = 14-22 Ft^3/yr; **moderately low** = 23-30 Ft^3/yr; **moderate** = 31-40 Ft^3/yr; **moderately high** = 41-60 Ft^3/yr; and **high** = greater than 60 Ft^3/yr.

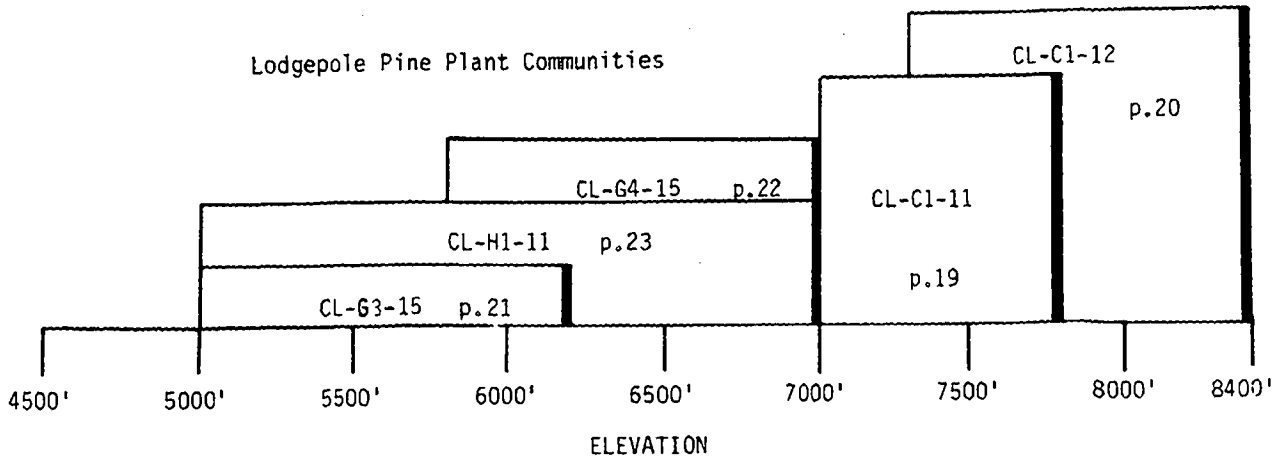
Characteristics (non-forest types): Each item represents data for good to excellent range conditions unless otherwise noted. **Herbage** is the air dried weight of all forbs, grasses, and grass-likes on the site in lbs/acre. **Surface Rock** is gravel and stone exceeding .75 inch in diameter which lie on soil surface. **BG + P** is bare ground and naturally occurring pavement less than .75 inch in diameter. **Moss** is the cover of ground surface other than rock that is occupied by moss and lichens. **Litter** is the cover of ground surface by dead vegetative material.

Table 1.

Elevational range of forested communities on the Fremont National Forest







PLANT ASSOCIATION KEY FOR THE FREMONT NATIONAL FOREST EXCLUSIVE OF THE PUMICE ZONE

1. Shrub-steppe or meadow vegetation predominates

2. Herbaceous vegetation predominates; shrubs occasionally present on low quality or highly deteriorated sites.

3. Dry sites; shallow, rocky soils; Sandberg bluegrass and narrowleaf goldenweed present.

Low Sagebrush-Goldenweed/Bluegrass
SD-92-11 Page 10

3. Wet sites; water table within 3 feet of surface; deep and dark soils present.

4. Kentucky bluegrass dominant; soil surface dry by early summer.

Bluegrass-Dry Meadow
MD-31-11 Page 11

4. Kentucky bluegrass absent or subordinate to tufted hairgrass and sedges.

5. Tufted hairgrass and sedges codominant. Soil surface wet in early summer, moist through early fall.

Hairgrass-Sedge-Moist Meadow
MM-19-11 Page 12

5. Sedges and rushes dominate. Tufted hairgrass not present or only a trace. Water table at or near soil surface throughout the growing season.

Sedge-Wet Meadow
MW-19-11 Page 13

2. Shrubby and herbaceous vegetation codominant; soils generally shallow and rocky. Western juniper occasional on some sites.

6. Big sagebrush dominant shrub species; bunchgrasses predominant herbaceous species; western juniper occasional; ponderosa pine occasional on sites near forest edge.

Big Sagebrush/Bunchgrass
SD-29-12 Page 14

6. Low sagebrush dominant shrub species; various grasses present.

7. Sandberg bluegrass, onespike oatgrass, and squirreltail dominant grass species, low sagebrush may be absent.

Low Sagebrush/Bluegrass-Onespike Oatgrass
SD-92-12 Page 15

7. Sandberg bluegrass, onespike oatgrass, and squirreltail not the dominant grass species; Idaho fescue or bluebunch wheatgrass dominant at low elevations with red fescue dominant grass at high elevations.

8. Idaho fescue, bluebunch wheatgrass, or western needlegrass dominant grass species.

9. Western juniper present.

Juniper/Low Sagebrush/Fescue
CJ-S1-12 Page 16

9. Western juniper not present.

Low Sagebrush/Fescue-Squirreltail
SD-19-13 Page 17

8. Red fescue dominant grass species; elevation greater than 7000'; granite gilia and Kings' sandwort subordinate herbaceous species.

Alpine Low Sagebrush/Red Fescue
SS-49-21 Page 18

1. Site dominated by forest vegetation.

10. Lodgepole pine is the dominant species in overstory and replacing itself in the stand as evidenced by the sequence of age classes.

11. High elevation (7400') community, reaching the tops of the highest ridges or mountains.

12. Whitebark pine and lodgepole pine major tree species with lodgepole pine being the more dominant.

Lodgepole Pine-Whitebark Pine/Gay Penstemon
CL-C1-11 Page 19

12. Whitebark pine, lodgepole pine, and western white pine major tree species; Wheeler's bluegrass and King's sandwort major herbaceous plants.

Lodgepole Pine-Whitebark Pine-Western White Pine/Sandwort
CL-C1-12 Page 20

11. Midslope and lower communities (less than 7400')

13. Lodgepole pine single dominant tree species.

14. Lower slope communities on flat ground; ponderosa pine occasionally codominant; strawberry, Idaho fescue, Ross' sedge and Wheeler's bluegrass dominate understory.

Lodgepole Pine/Strawberry-Fescue
CL-G3-15 Page 21

14. Mid-slope communities on flat to gently sloping ground; white fir occasional in understory; long-stolon sedge, lupine, squirreltail, and needlegrass dominate understory.

Lodgepole Pine/Squirreltail-Long-stolon Sedge
CL-G4-15 Page 22

13. Lodgepole pine codominant with either white fir or quaking aspen.

15. White fir major tree species associated with lodgepole pine; linanthastrum, long-stolon sedge, and western needlegrass dominant herbaceous plants.

White Fir-Lodgepole Pine/Long-stolon sedge-Needlegrass
CW-C3-11 Page 30

15. White fir absent or very infrequent; wet sites with quaking aspen as a dominant tree species; diverse ground cover of herbaceous plants.

Lodgepole Pine-Quaking Aspen/Strawberry
CL-H1-11 Page 23

10. Lodgepole pine absent or subordinate in overstory and understory.

16. Ponderosa pine the dominant species in the overstory and replacing itself in the stand as evidenced by age classes; other tree species highly subordinate.

17. Bitterbrush major shrub species.

18. Idaho fescue dominant herbaceous plant.

19. Big sagebrush codominant with bitterbrush and occasional mountain-mahogany.

Ponderosa Pine-Juniper/Mountain-Mahogany-Bitterbrush-Big Sagebrush/Fescue
CP-C2-11 Page 24

19. Big sagebrush absent or only occasional; mountain-mahogany found in most stands.

Ponderosa Pine/Bitterbrush/Fescue
CP-S2-11 Page 25

18. Idaho fescue and strawberry present in most stands; manzanita codominant with bitterbrush.

Ponderosa Pine/Bitterbrush-Manzanita/Fescue
CP-S2-17 Page 26

17. Bitterbrush absent or highly subordinate.

20. Idaho fescue dominant herbaceous plant; brush species mostly lacking in northern stands.

Ponderosa Pine/Bitterbrush/Fescue
CP-S2-11 Page 25

20. Idaho fescue and bitterbrush absent; mountain big sagebrush, quaking aspen, serviceberry and/or wooly wyethia dominant.

21. Serviceberry and/or wooly wyethia dominant plants in understory.

Ponderosa Pine/Wooly Wyethia
CP-F1-11 Page 27

21. Serviceberry and/or wooly wyethia absent; quaking aspen or mountain big sagebrush dominant plants.

22. Poorly drained soils, wet site with quaking aspen present in either overstory or understory.

Ponderosa Pine-Quaking Aspen/Bluegrass
CP-H3-11 Page 28

22. Well drained high elevation (greater than 6000') sites.

23. Mountain big sagebrush dominant in somewhat open park-like stands.

Ponderosa Pine/Mountain Big Sagebrush/Bluegrass
CP-S1-21 Page 29

23. Mountain big sagebrush and/or common snowberry dominant; regenerating tree species both white fir and ponderosa pine.

White Fir-Ponderosa Pine/Snowberry/Starwort
CW-S3-13 Page 31

16. Ponderosa pine subordinate or no more than codominant with white fir and/or sugar pine, incense cedar or western white pine.

24. Dominant tree overstory and understory ponderosa pine and white fir; occasional lodgepole pine subordinate.

25. Snowberry dominant shrub species, manzanita absent.

White Fir-Ponderosa Pine/Snowberry/Starwort
CW-S3-13 Page 31

25. Snowberry dominant to absent, manzanita common to codominant, squawcarpet, serviceberry, and/or Oregon grape usually present.

White Fir-Ponderosa Pine/Manzanita-Oregon Grape
CW-S1-17 Page 32

24. Ponderosa pine and white fir codominant in the overstory and understory with incense cedar, sugar pine, lodgepole pine, western white pine or quaking aspen being present in the overstory and understory.

26. Incense cedar codominant in both the overstory and understory.

27. Incense cedar and sugar pine present in both the overstory and understory.

White Fir-Ponderosa Pine-Sugar Pine/Manzanita
CW-C4-12 Page 33

27. Sugar pine absent; ponderosa pine, white fir, and incense cedar present in both the overstory and understory.

White Fir-Ponderosa Pine-Incense Cedar/Serviceberry
CW-C1-11 Page 34

26. Incense cedar absent in overstory and understory (if present at all then highly scattered); western white pine, lodgepole pine, or quaking aspen found in both the overstory and the understory.

28. Western white pine found in both the overstory and understory; sticky currant major shrub species.

White Fir-Ponderosa Pine-Western White Pine/Sticky Currant
CW-C4-11 Page 35

28. Western white pine absent, either lodgepole pine or quaking aspen found in association with ponderosa pine and white fir.

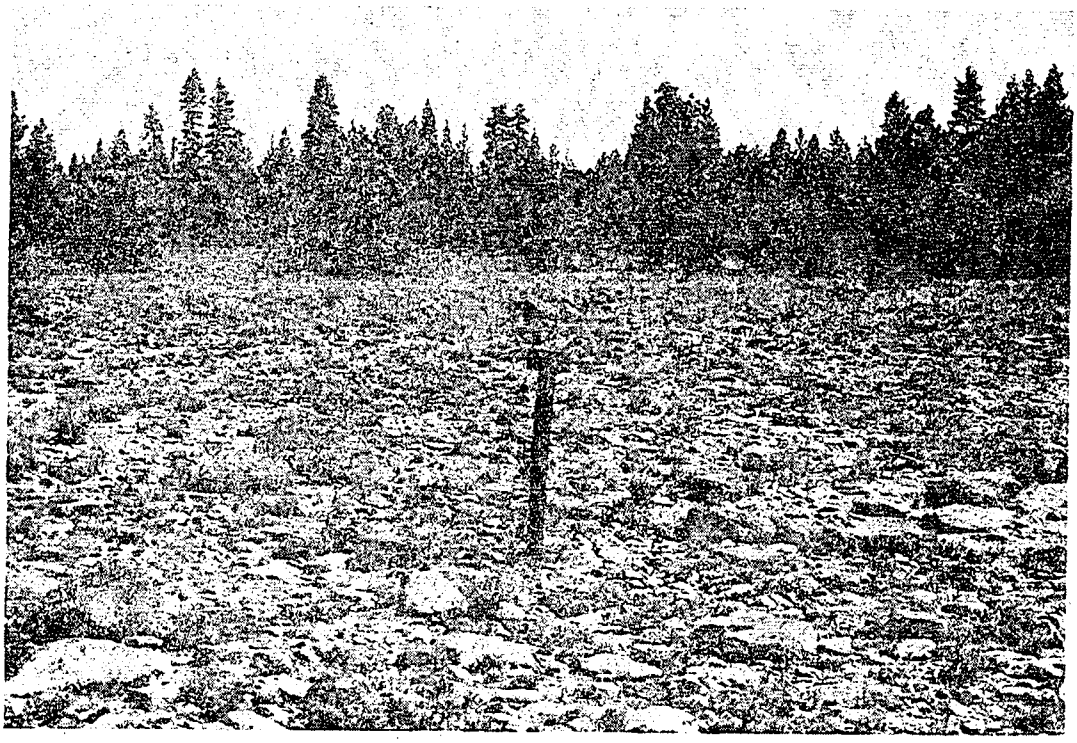
29. Lodgepole pine present in overstory and understory; creeping snowberry major shrub.

White Fir-Ponderosa Pine/Snowberry/Starwort
CW-S3-13 Page 31

29. Lodgepole pine absent; wet sites with quaking aspen present in understory and usually present in overstory; diverse ground cover of herbaceous plants.

White Fir-Ponderosa Pine-Quaking Aspen/Long-Stolon Sedge
CW-H2-11 Page 36

LOW SAGEBRUSH-GOLDENWEED/BLUEGRASS SD-92-11



LOW SAGEBRUSH-GOLDENWEED/BLUEGRASS SD-92-11

ENVIRONMENT

Location: All of Fremont
Elevation: 5000-6000 ft.
Aspect: All aspects
Percent Slope: 0-4
Slope position: Lower to upper one-third
Topography: Flat

SOILS

Geology: Basalt, loess, pumice ash
Total Depth: 5-13 in.
Rooting Depth: 5-13 in.
Percent Stone: 0-60
Texture: Sandy loam to clay loam
Remarks: Stony soil generally less than 9 inches deep, rocky surface

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Low sagebrush	0-20	50	Increaser
Narrowleaf goldenweed	1-3	100	Increaser
Sandberg bluegrass	1-3	100	Decreaser
Squirreltail	1-3	100	Increaser/decreaser
Biscuitroot	0-1	80	Increaser
Pussytoes	0-1	70	Increaser

Good Condition: Dominated by Sandberg bluegrass and squirreltail; looks similar to very poor condition low sagebrush/bluegrass type, except for presence of narrowleaf goldenweed. Surface rock and bareground prevalent; "erosion" pavement is result of frost heaving and is natural. Erosion pavement reduces wind erosion and puddling of soil surface due to rain.

Poor Condition: Dominance of increasers, loss of Sandberg bluegrass and squirreltail cover. Increase of cover of biscuitroot, pussytoes, knotweed, and small annual forbs.

Indicators: Very low percent vegetative cover, presence of narrowleaf goldenweed.

Revegetation: Should not be attempted; soils too shallow, rocky, and droughty for successful establishment of non-native herbaceous species.

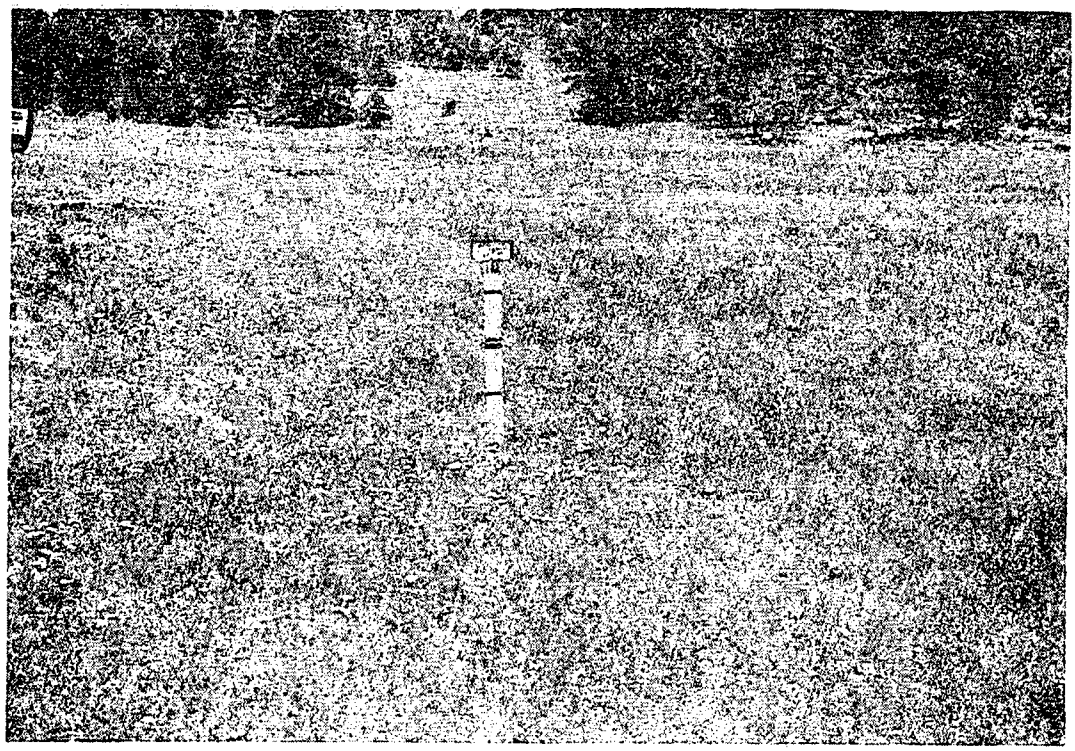
Problems Associated with Management: Soils highly susceptible to accelerated erosion if erosion pavement is lost. Site will require excessively long time to revegetate with native species following disturbance. In spring avoid use by livestock when soils are saturated.

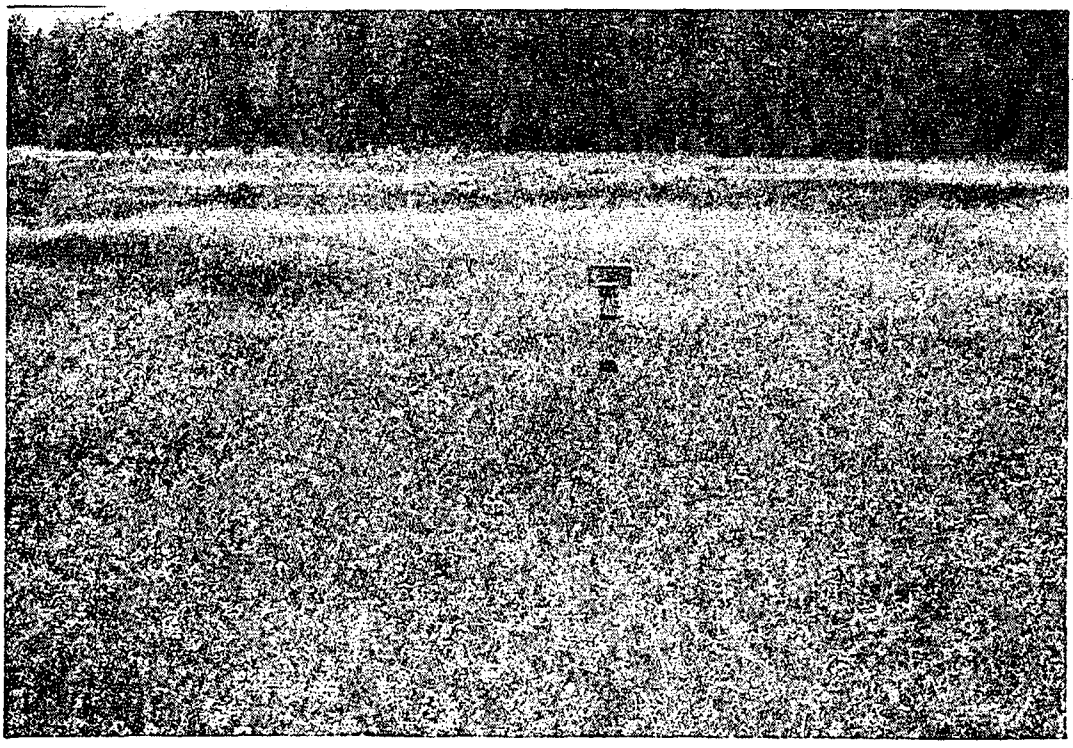
CHARACTERISTICS (6 plots in good-excellent condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		42	38	4	8
5% C.I.		8.8	11	4.9	8

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

BLUEGRASS - DRY MEADOW MD-31-11





BLUEGRASS-DRY MEADOW MD-31-11

ENVIRONMENT

Location: All of Fremont
Elevation: 4800-6000 ft.
Aspect: All aspects
Percent Slope: 0-5
Slope Position: Bottoms
Topography: Flat

SOILS

Geology: Alluvium
Total Depth: 18-36 in.
Rooting Depth: 18-30 in.
Percent Stone: 0-20
Texture: Sandy silt loam to clay
Special: Water table at or near surface in early summer, entire profile dry by early fall.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Kentucky bluegrass	7-30	100	Increaser/decreaser
Baltic rush	1-10	100	Increaser
Smallwing sedge	0-15	60	Increaser
Yarrow	0-3	60	Increaser
Longstem clover	0-6	50	Increaser

Good Condition: No dry meadows in climax or near climax vegetation could be found on the Fremont National Forest. Kentucky bluegrass is an introduced species and since it withstands heavy grazing it dominates most dry meadows. Litter covers up to 50 percent of the soil surface and there is less than 20 percent bareground. Kentucky bluegrass is dominant with various combinations of northern meadow barley, California oatgrass, pullup muhly, timothy, and sedges being subordinate. Occasional silver sagebrush may be found in stable, good condition community.

Poor Condition: Bareground may exceed 40 percent. Kentucky bluegrass very sparse and there is a predominance of low value forbs and grasses: yarrow, clovers, cinquefoils, pussytoes, baltic rush, asters, and dandelion are common on these deteriorated sites. Some sites where water table has been lowered by streambed erosion are now totally dominated by silver sagebrush.

Indicators: Community normally found in association with moist or wet meadows. On moist sites, bluegrass decreases and hairgrass becomes dominant; on drier sites, bluegrass decreases and sagebrush increases with a decrease in soil depth.

Revegetation: On poor condition sites not shrub infested, proper use should allow Kentucky bluegrass to regain desired composition and vigor. On silver sagebrush infested sites removal of shrub competition and raising of the water table is required before reseeding. For continued livestock use, Kentucky bluegrass with perennial ryegrass and a little giant wildrye provides the best combination of production and protection for the site. Tall or streambank wheatgrass should be seeded to stabilize streambanks.

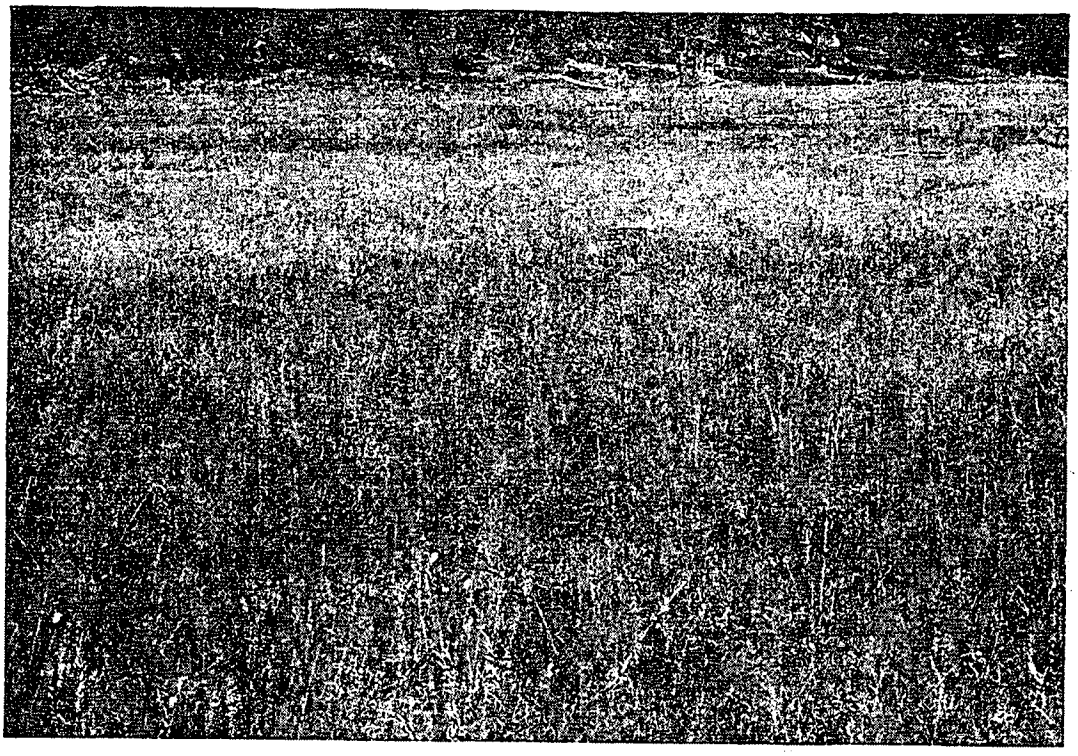
Problems Associated with Management: Community is sensitive to livestock use, particularly when soils are saturated in early season. Proper seasonal use and effective livestock distributional techniques should be practiced to return and retain these sites in their highly productive state.

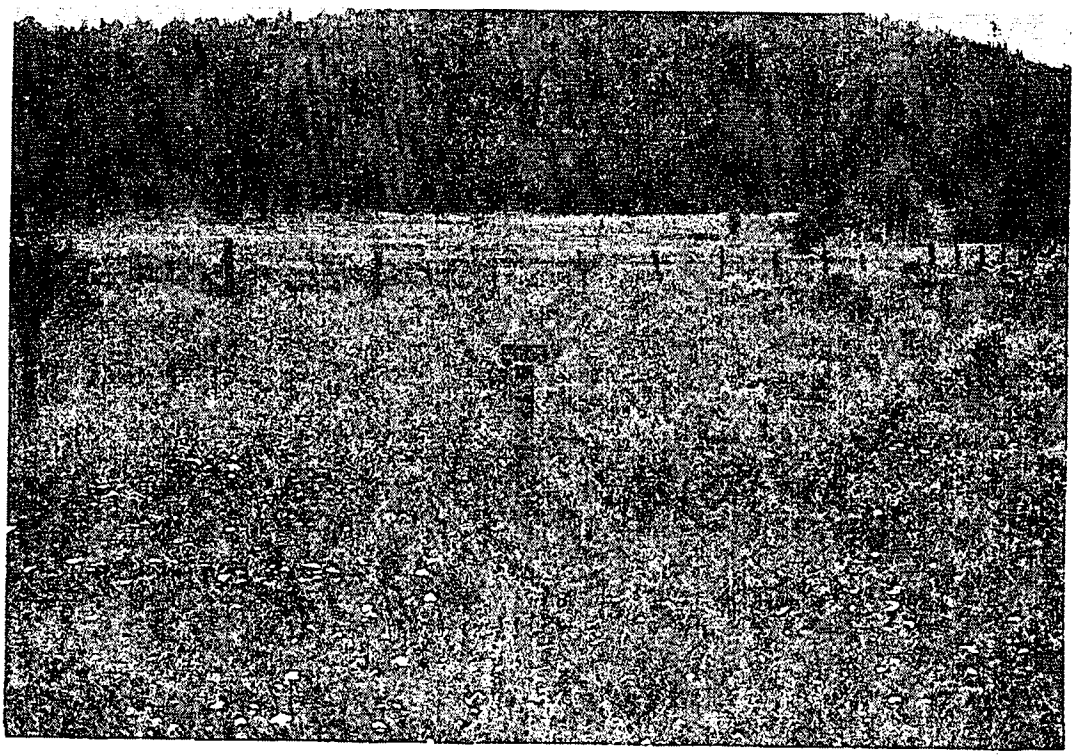
CHARACTERISTICS (7 plots in good-excellent condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		0	10	1	34
5% C.I.			9	2	14

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

HAIRGRASS - SEDGE - MOIST MEADOW MM-19-11





HAIRGRASS-SEDGE-MOIST MEADOW MM-19-11

ENVIRONMENT

Location: All of Fremont
Elevation: 5400-6900 ft.
Aspect: Southwest to northwest
Percent Slope: 0-4
Slope position: Bottoms
Topography: Flat

SOILS

Geology: Alluvium
Total Depth: 20+ in.
Rooting Depth: 9-20 in.
Percent Stone: 0-50 (80)
Texture: Gravelly silt loam to clay
Special: Water table within 20-30 in. of soil surface most of the growing season; rooting zone always moist, sometimes saturated. Soil surface too wet for spring or early summer use.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Tufted hairgrass	5-15	100	Decreaser
Nebraska sedge	0-20	80	Decreaser
Baltic rush	1-10	100	Increaser
Smallwing sedge	0-10	60	Decreaser
Pullup muhly	0-15	60	Increaser

Good Condition: Dominance is shared between tufted hairgrass and the various sedges found in this community. Baltic rush and pullup muhly always subordinate. Litter layer very thick and not compacted. Occasional silver sagebrush may be present at one percent cover or less. Site normally too wet for forbs.

Poor Condition: Dominance of forbs with Kentucky bluegrass and baltic rush indicates a deteriorated site. Dominance of falsehellebore indicates very poor condition. Apparent poor condition may be due to lowered watertable caused by channel cutting rather than livestock overgrazing. Silver sagebrush invades and dominates these deteriorated drier sites.

Indicators: A trace of American bistort, monkeyflower, and speedwell indicate a wetter site; a trace of Kentucky bluegrass, meadow barley, and cinquefoils indicates a drier site.

Revegetation: Generally not recommended without control of silver sagebrush, channel cutting and livestock use. Meadow foxtail, alta fescue, reed canarygrass, tall wheatgrass, and native species are best suited for the site.

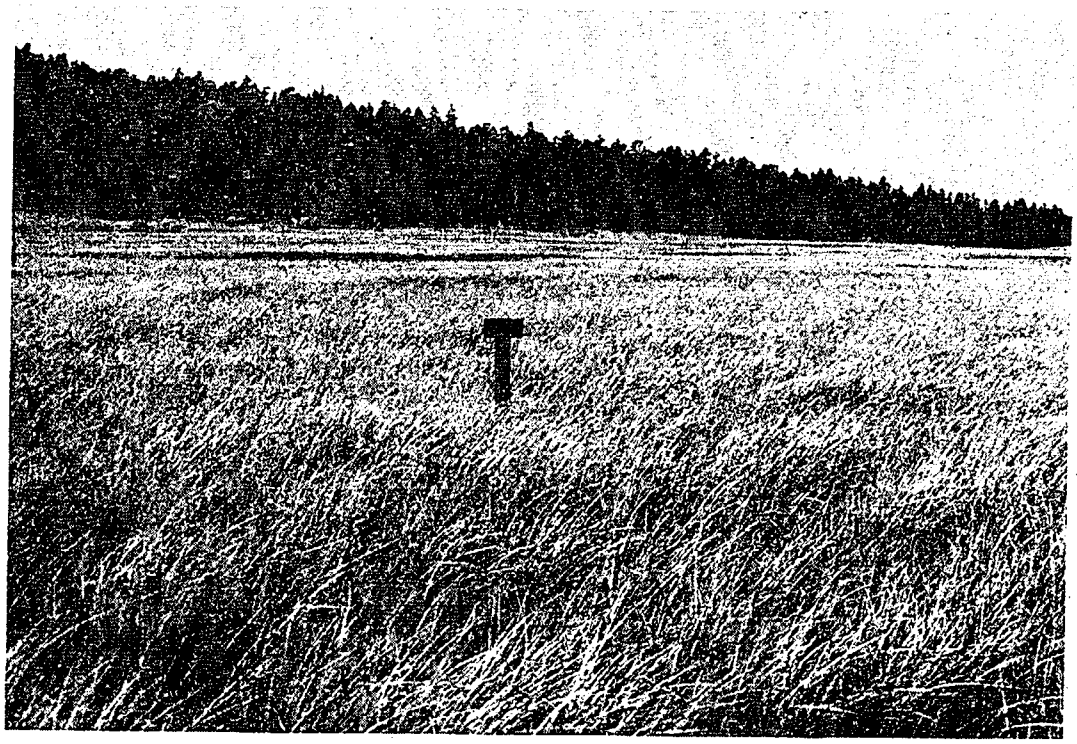
Problems Associated with Management: Normally experience little livestock use until late summer; moderate use not detrimental if restricted to use after soil surface dries and grasses and sedges have been allowed to set seed. Unused sites tend to increase in litter and decrease in vegetative cover; livestock use or periodic burning will remove and breakup litter layer.

CHARACTERISTICS (5 plots in good-excellent condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		0	1	5	53
5% C.I.			3	10	19

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

SEDGE - WET MEADOW MW-19-11



SEDGE-WET MEADOW MW-19-11

ENVIRONMENT

Location: All of Fremont
Elevation: 5000-6800 ft.
Aspect: All aspects
Percent Slope: 0-5
Slope Position: Bottoms
Topography: Flat

SOILS

Geology: Alluvium
Total Depth: Unknown
Rooting Depth: 9-20 in. (36)
Percent Stone: 0 (50)
Texture: Gravelly silt loam to clay
Special: Water at or within 20 in. of soil surface throughout growing season. Soil surface displacement related to livestock use.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Nebraska sedge	0-10	60	Decreaser
Smallwing sedge	0-15	40	Decreaser
Water sedge	0-15	25	Decreaser
Bigleaf sedge	0-20	20	Decreaser
Beaked sedge	0-15	20	Decreaser
Baltic rush	0-10	80	Increaser
Pullup muhly	0-2	30	Increaser

Good Condition: Soil surface wet or moist throughout growing season. Wetland sedges dominant; tufted hairgrass present in no more than trace amounts. Litter layer very thick and not compacted around the base of the continuous sedge canopy cover. Basal area cover is extremely low on undisturbed (climax) sites. Light to moderate use will increase cover and productivity of these sites.

Poor Condition: Increase in baltic rush and wetland forbs. This condition is rarely observed as livestock must be forced to overgraze this community.

Indicators: Wet sites are pure sedges; drier sites have wetland forbs in small amounts.

Revegetation: Not recommended due to cattle preference for other types and the potential soil loss associated with a denuded area. On drier sites, mid-to-late fall grazing can be enhanced by conversion to reed canarygrass, meadow foxtail, alta fescue, red top, and alsike clover.

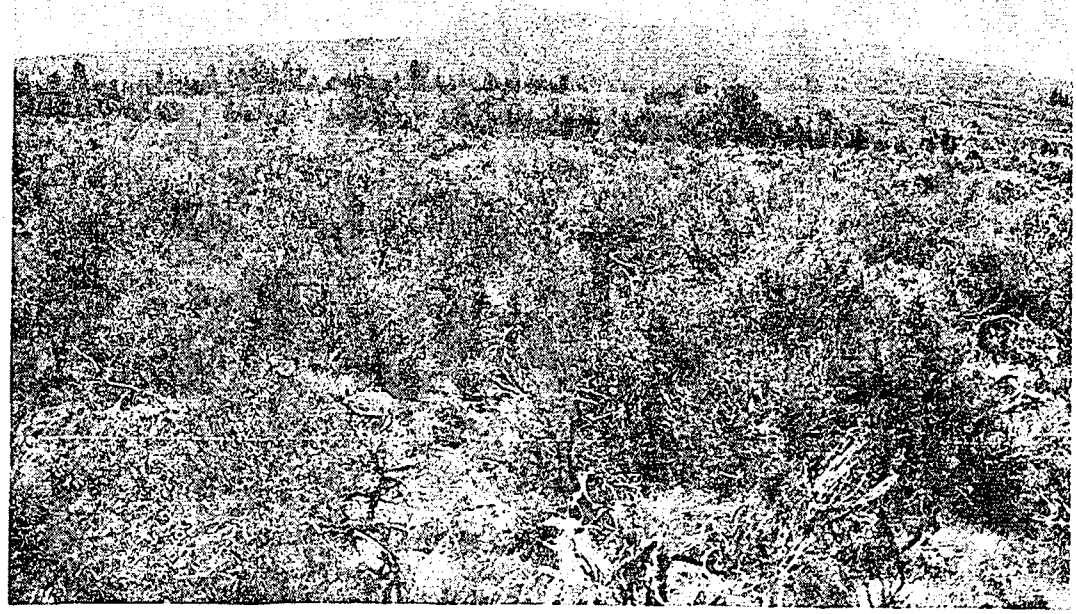
Problems Associated with Management: Site is wet almost year-round. Most species of sedge are palatable if utilized in early spring. Forced use or prescribed burning in fall will remove a portion of the litter layer and increase site productivity.

CHARACTERISTICS (9 plots in good-excellent condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		0	0	11	38
5% C.I.				8	11

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

BIG SAGEBRUSH/BUNCHGRASS SD-29-12



BIG SAGEBRUSH/BUNCHGRASS SD-29-12

ENVIRONMENT

Location: Northern half of Fremont
Elevation: 4900-7100 ft.
Aspect: Westerly
Percent Slope: 2-30 (50)
Slope Position: Lower one-third
Topography: Flat, convex, sideslopes

SOILS

Geology: Ash over basalt
Total Depth: 20-30 in.
Rooting Depth: 8-20 in. (30)
Percent Stone: 0-5 (20)
Texture: Loamy sand to sandy silt loam
Special: Some sites are very gravelly, all sites have deep well-drained soil. Pumice and pumice ash prevalent.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Big sagebrush	7-20	100	Increaser, climax shrub
Idaho fescue	0-10	75	Decreaser
Bluebunch wheatgrass	0-8	50	Decreaser
Sandberg bluegrass	T-1	100	Increaser
Squirreltail	T-3	75	Increaser
Ross' sedge	0-2	75	Decreaser
Yarrow	0-1	75	Increaser
Western juniper	0-4 trees per acre	25	Increaser

Good Condition: Bunchgrass is dominant herbaceous cover. Green and gray rabbitbrush are highly dispersed. Bitterbrush and curlleaf mountain-mahogany are occasional. Trace of many small forbs found on majority of the sites. Mountain big sagebrush is found above 6000 feet in elevation; basin big sagebrush is below 6000 feet.

Poor Condition: Big sagebrush, green and gray rabbitbrush, and cheatgrass dominate site. Sandberg bluegrass and squirreltail absent on heavily overgrazed sites. Western juniper will increase in cover with continued overuse and absence of fire.

Indicators: Idaho fescue dominant on more northerly exposures and bluebunch wheatgrass more dominant on southerly exposures with well-drained soils.

Revegetation: Seeding with non-native grass species is generally successful, after mechanical or chemical control of brush. Complete brush control questionable as big sagebrush and bitterbrush are important big game winter habitat species. Suggested seed mix of crested wheatgrass, pubescent wheatgrass, intermediate wheatgrass, and/or Russian wildrye.

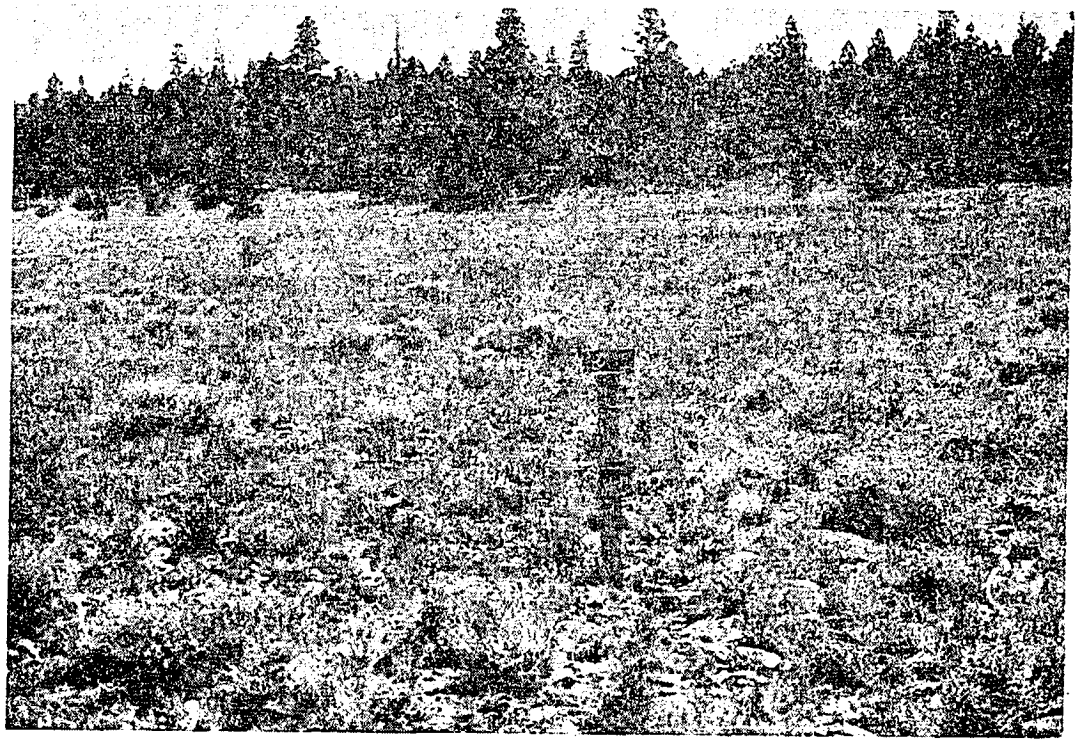
Problems Associated with Management: Excellent potential for grass production on these sites. Mountain big sagebrush is a desirable species for browse production and wildlife cover. Brush control by means of fire alone can lead to dominance of site by green or gray rabbitbrush.

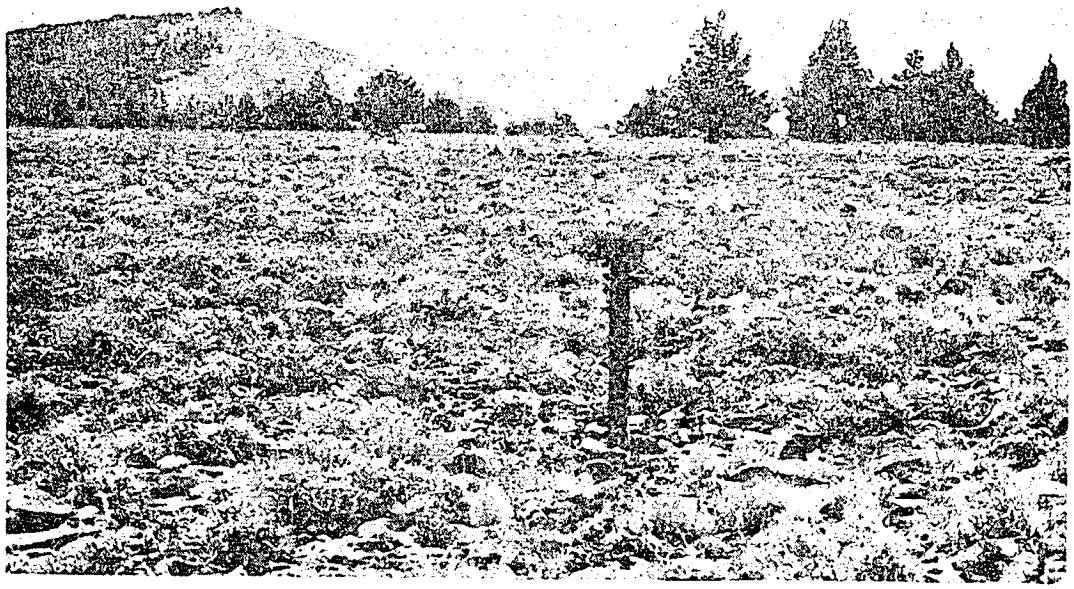
CHARACTERISTICS (4 plots in good-excellent condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		14	36	2	35
5% C.I.		30	27	3	21

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

LOW SAGEBRUSH/BLUEGRASS-ONESPIKE OATGRASS SD-92-12





LOW SAGEBRUSH/BLUEGRASS-ONESPIKE OATGRASS SD-92-12

ENVIRONMENT

Location: All of Fremont
Elevation: 4600-6100 ft.
Aspect: All aspects
Percent Slope: 1-20
Slope Position: Lower to upper one-third
Topography: Flat, convex

SOILS

Geology: Basaltic flows, pumice ash, loess
Total depth: 10-24 in.
Rooting depth: 7-18 in. (24)
Percent Stone: 2-50 (75)
Texture: Gravelly silt loam to silty clay (clay).
Special: Very rocky surface, water saturation during winter and spring limits revegetation potential.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Low sagebrush	0-15 (25)	70	Increaser, climax shrub
Sandberg bluegrass	1-10	100	Decreaser
Onespike oatgrass	1-10	100	Decreaser
Squirreltail	0-2	95	Increaser
Pussytoes	0-3	80	Increaser
Biscuitroot	0-2	90	Increaser

Good Condition: Decreaser plants and low sagebrush dominant. Litter, moss, and rock protect soil surface from wind erosion and puddling. All ages of shrub present; varied assortment of forb species present.

Poor Condition: Decreasers restricted to protection of shrub crowns and surface rock crevices. In poor condition there will be an increase in cover of biscuitroot, pussytoes, rockcress, sandwort, and other ephemeral and unpalatable forbs. Cheatgrass brome invades deeper soil sites with heavy overgrazing.

Indicators: Xeric stands with deep soils lose the oatgrass component and grade into low sagebrush/fescue-squirreltail type.

Revegetation: Hardpan normally at 12 to 20 inches deep. Water saturation in winter and spring, extreme drought in summer and fall, and very rocky soil surface would make a concerted revegetation effort with non-native grass species impractical.

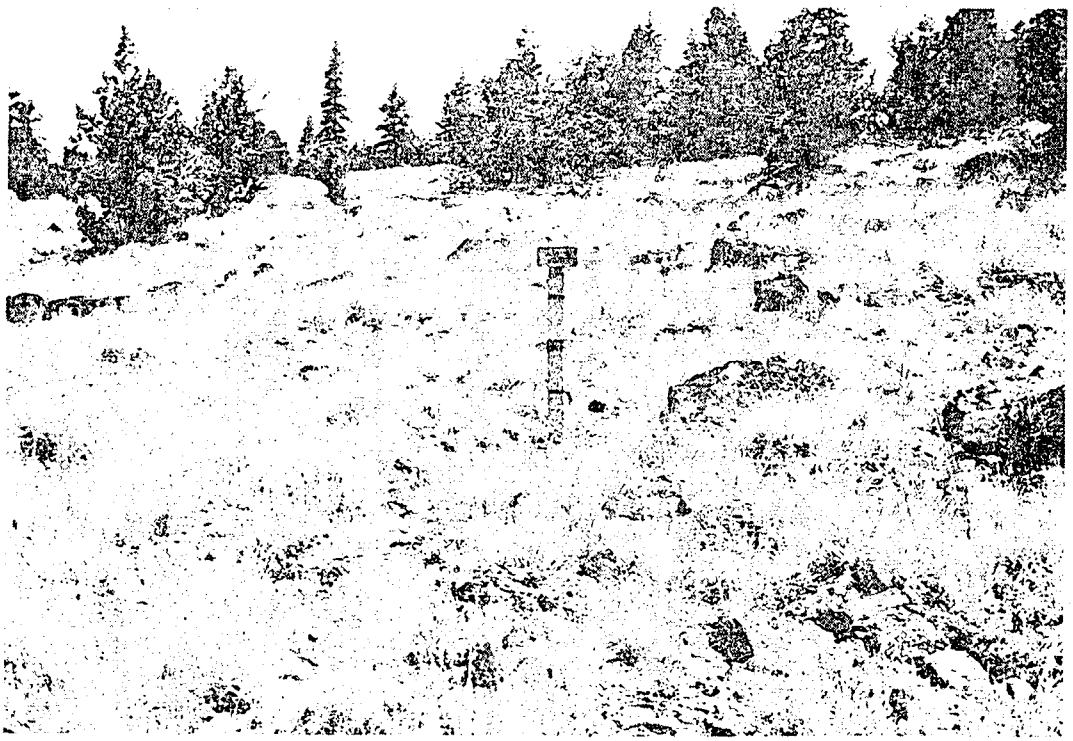
Problems Associated with Management: This type is generally found as small mesic pockets scattered within the low sagebrush/fescue-squirreltail type. An average of 40 percent of the soil surface is covered with a protective rock covering making revegetation operations difficult and undesirable. Soils susceptible to compaction if subjected to use during late winter or spring.

CHARACTERISTICS (14 plots in good conditions)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		38	27	5	17
5% C.I.		8	8	3	5

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

JUNIPER/LOW SAGEBRUSH/FESCUE CJ-S1-12



JUNIPER/LOW SAGEBRUSH/FESCUE CJ-S1-12

ENVIRONMENT

Location: All of Fremont
Elevation: 4700-6000 ft.
Aspect: Southwest to northwest
Percent Slope: 2-20
Slope Position: Lower to upper one-third
Topography: Convex ridges to flat sideslopes

SOILS

Geology: Basalt, andesite, pumice
Total Depth: 6-20 in. (26)
Rooting Depth: 6-20 in. (26)
Percent Stone: 5-80
Texture: Gravelly sandy loam to clay loam
Special: Soil surface is generally very rocky, underlain by cracked bedrock.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Low sagebrush	0-20	75	Increaser, climax shrub
Mountain-mahogany	0-15	20	Increaser, climax shrub
Idaho fescue	0-10	90	Decreaser
Bluebunch wheatgrass	0-5	80	Decreaser
Western needlegrass	0-5	40	Decreaser
Sandberg bluegrass	1-5	100	Increaser
Squirreltail	0-2	95	Increaser
Western juniper	2-4 trees per acre	100	Increaser, climax tree

Good Condition: Bunchgrasses and low sagebrush dominant. Western juniper and/or curlleaf mountain-mahogany present. Soil surface tends to be extremely rocky with western juniper restricted to these areas. Less rocky areas of this type are dominated by curlleaf mountain-mahogany in the overstory. Forb species are relatively few and low in cover.

Poor Condition: Bunchgrasses restricted to protection of shrub canopies and rock crevices. Increased cover of bluegrass, squirreltail, biscuitroot and pussytoes. Heavily overgrazed or burned sites are invaded by rabbitbrush and cheatgrass.

Indicators: Savannah-like appearance due to openness of shrubs and trees. Presence of juniper indicates bedrock fracturing, deeper soils, and/or sites protected from natural fires by extensive surface rock.

Revegetation: Soil surface is too rocky for drilling of grass seed. Broadcast seeding may be attempted, if necessary; expect only poor to fair success. Use seed mix of "Nordan" or "Fairway" crested wheatgrass and "Topar" pubescent wheatgrass.

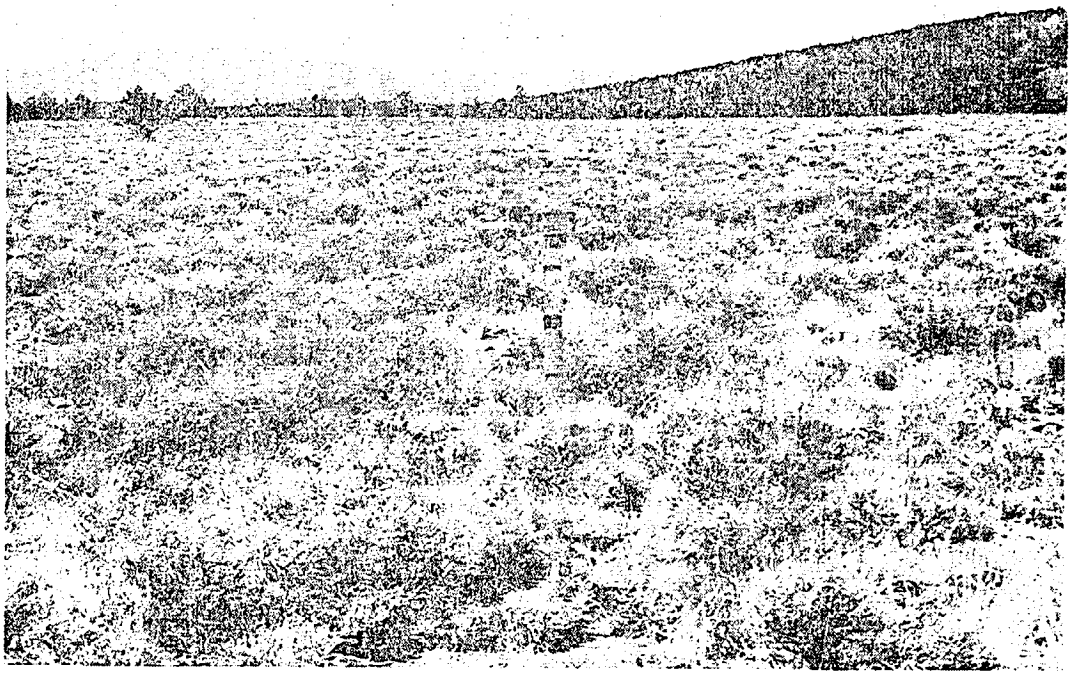
Problems Associated with Management: Extremely rocky soil surface makes tree and shrub control and revegetation efforts very difficult. Exclusion of periodic fire invites juniper expansion.

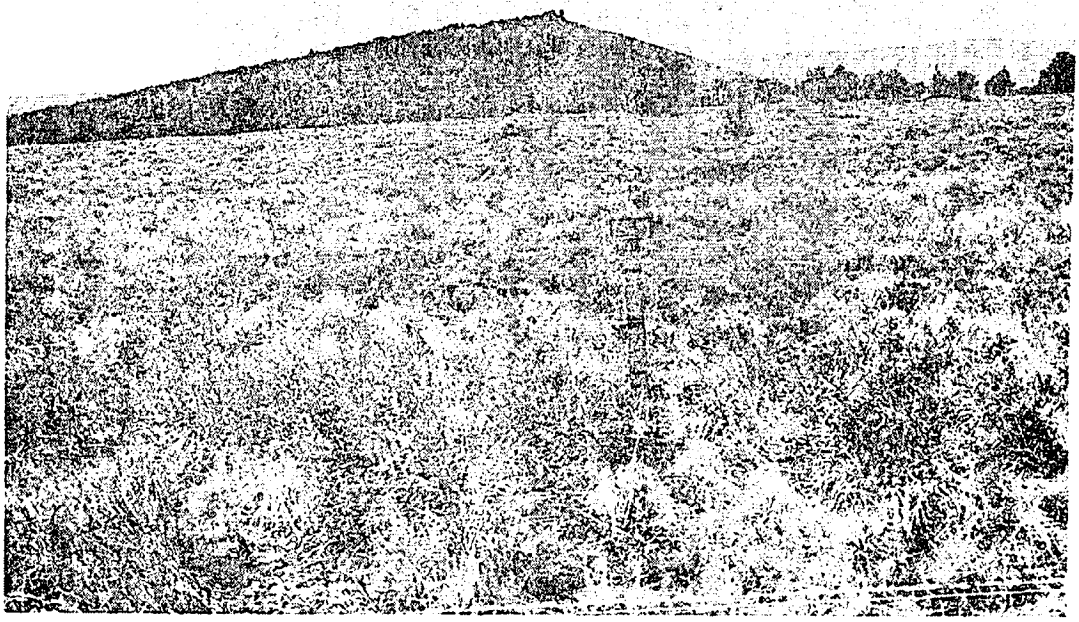
CHARACTERISTICS (19 plots in good-excellent condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		29	24	3	30
5% C.I.		8	5	1	5

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

LOW SAGEBRUSH/FESCUE-SQUIRRELTAIL SD-19-13





LOW SAGEBRUSH/FESCUE-SQUIRRELTAIL SD-19-13

ENVIRONMENT

Location: All of Fremont
Elevation: 4800-5700 ft.
Aspect: Southwest to northerly
Percent Slope: 2-15 (20)
Slope Position: Lower to upper one-third
Topography: Convex ridges to flat sideslopes

SOILS

Geology: Basalt, pumice and loess, alluvium
Total Depth: 9-20 in.
Rooting Depth: 9-20 in. (24)
Percent Stone: 0-50
Texture: Sandy silt loam to clay loam (silty clay)
Special: Some winter and early spring soil saturation, surface rock and bedrock fracturing prevalent. Duripan usually located at a depth of 15-20 inches.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Low sagebrush	1-25	100	Increaser, climax shrub
Idaho fescue	1-15	100	Decreaser
Bluebunch wheatgrass	0-5	45	Decreaser
Western needlegrass	0-5	25	Decreaser
Sandberg bluegrass	1-5	100	Increaser
Squirreltail	1-2	100	Increaser

Good Condition: Bunchgrass and low sagebrush dominant. Soil surface covered with litter, pavement and surface rock. Forb species prevalent, varied, and subordinate. All age classes of bunchgrasses and sagebrush present. In years with good soil moisture regime, the stature of the bunchgrasses hides the sagebrush giving an impression of pure grasslands.

Poor Condition: Bunchgrasses restricted to protection of shrub canopy and rock crevices. Sandberg bluegrass, squirreltail, biscuitroot, pussytoes, sandwort, and cheatgrass become dominant vegetation. Greatly increased bareground and erosion pavement. Rabbitbrush and cheatgrass invade heavily overgrazed or burned sites.

Indicators: More mesic sites have onespike oatgrass and junegrass. Bluebunch wheatgrass is normally found only on well drained biscuits of biscuit-swale type topography.

Revegetation: Seeding of drought tolerant species ("Nordan" crested wheatgrass, "Topar" pubescent wheatgrass, or intermediate wheatgrass) possible on some sites. Many sites are too rocky or the soil is too shallow for economically successful revegetation. Low sagebrush and bitterbrush are palatable for wildlife and should be retained on a portion of treated areas.

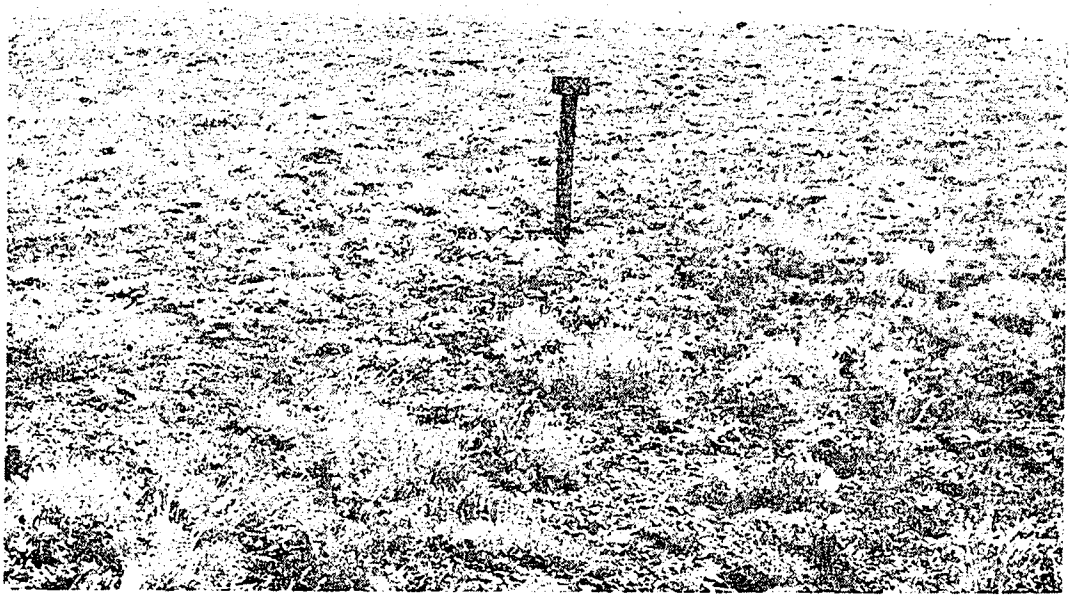
Problems Associated with Management: Soils susceptible to compaction if subjected to use during late winter or spring when soil is very wet or fully saturated. This type supplies significant year-round forage for both mule deer and pronghorn antelope.

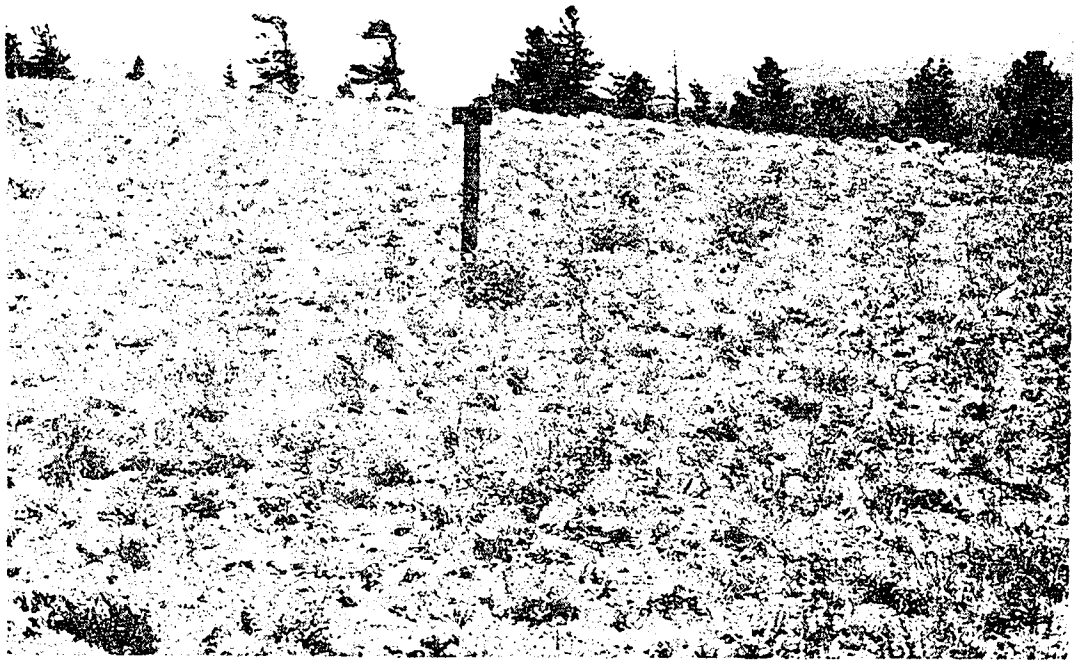
CHARACTERISTICS (27 plots in good condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		27	28	3	27
5% C.I.		9	6	1	4

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

ALPINE LOW SAGEBRUSH/RED FESCUE SS-49-21





ALPINE LOW SAGEBRUSH/RED FESCUE SS-49-21

ENVIRONMENT

Location: All of Fremont
Elevation: 7000-8000 ft.
Aspect: All aspects
Percent Slope: 10-30
Slope Position: Upper one-third to top
Topography: Ridge tops and convex sideslopes, generally above timberline

SOILS

Geology: Basalt and rhyolite
Total Depth: 16-36 in.
Rooting Depth: 9-20 in. (36)
Percent Stone: 30-80
Texture: Very gravelly loamy sand to gravelly clay
Special: Soil surface protected by rocks and erosion pavement. Rhyolite is main soil component.

VEGETATION

Dominants	% Cover[1]	Constancy	Status
Subalpine big sagebrush	0-50	20	Increaser, climax shrub
Low sagebrush	0-25	90	Increaser, climax shrub
Granite gilia	0-10	30	Increaser, climax shrub
Red fescue	5-15	100	Decreaser
King's sandwort	0-5 (20)	70	Increaser
Sandberg bluegrass	1-10	100	Decreaser
Squirreltail	1-10	100	Increaser
Moss phlox	0-5	30	Increaser

Good Condition: Sagebrush and red fescue are stand dominants. Granite gilia, king's sandwort, and balloonpod milkvetch are usually present but subordinate on low sagebrush sites. Bitterbrush is usually present on subalpine big sagebrush sites. Low sagebrush sites have high coverage of rocks and erosion pavement.

Poor Condition: Due to inaccessibility of site to livestock, no communities in poor condition were located. Shrubs and low quality annual and perennial forbs should dominate the site in poor condition. Dominance of squirreltail over red fescue and sandberg bluegrass indicates a probable downward trend.

Indicators: Elevation of 7000 feet or more. Red fescue present on all sites. Shallow soil ridgetops and sideslopes have low sagebrush and granite gilia; deeper soil (24-36 inches) sideslopes have subalpine big sagebrush and bitterbrush.

Problems Associated with Management: Revegetation with introduced species should not be attempted. Important wildlife habitat.

CHARACTERISTICS (9 plots in good-excellent condition)

	Herbage	Surface Rock	BG&P	Moss	Litter
Mean		11	26	0	37
5% C.I.		8	8		10

[1] % Cover: Shrub cover given as canopy cover; herbaceous cover given as basal area cover.

LODGEPOLE PINE-WHITEBARK PINE/GAY PENSTEMON CL-C1-11

LODGEPOLE PINE-WHITEBARK PINE/GAY PENSTEMON CL-C1-11

ENVIRONMENT

Location: West of Highway 395
Elevation: 7000-9000 ft.
Aspect: All aspects
Percent Slope: 3-20
Slope Position: Upper one-third to top
Topography: Flat to convex ridges

SOILS

Geology: Tuffs, breccias, basalt
Grass Rooting Depth: 5-15 in.
Tree/Shrub Rooting Depth: 20-30 in.
Percent Stone: 10-70
Texture: Gravelly, coarse sand
Special: Poorly developed soils

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Lodgepole pine	5-30	2-30	100	100	Climax
Whitebark pine	1-30	1-10	100	100	Climax
Long-stolon sedge		0-10		95	Increaser
Wheeler's bluegrass		0-10		75	Increaser
Gay penstemon		0-10		45	Increaser

Ground Vegetation: Lodgepole pine and whitebark pine regeneration found throughout but lodgepole pine regeneration obviously more abundant. Stands almost completely devoid of shrubs; pinemat manzanita highly irregular in occurrence. Herbaceous cover dominated by Wheeler's bluegrass, long-stolon sedge, tailcup lupine, and gay penstemon. Western needlegrass and bottlebrush squirreltail found occasionally.

Indicators: The presence of whitebark pine with long-stolon sedge always indicate high elevation harsh site.

Silviculture: Moderate site productivity; high elevation limits operability and impacts regeneration success. Regeneration often highly localized. Shelterwood best suited for site due to potential severe change in microsite associated with logging. Pruning and thinning highly questionable in light of overall productivity. Moderate success indicated for planting lodgepole pine in shelterwoods. Stockability for lodgepole pine is 71-127 sq. ft. BA/acre.

Revegetation: Perennial grass mix of hard fescue, orchardgrass, and alpine timothy suggested.

Problems Associated with Management: Short growing season and heavy snow loads impact management. Soils that have been disturbed are easily displaced by wind and rain. Potential hydrophobic soils following fire.

PRODUCTIVITY (16 plots)

	Site Index	TBA		GBA	Ft^3/Yr Index
	(LP)	(LP)	(WBP)	(LP)	(LP)
Mean	51	136	12	99	29
5% CI	3	27	6	28	9

LODGEPOLE PINE-WHITEBARK PINE-WESTERN WHITE PINE/
SANDWORT CL-C1-12

LODGEPOLE PINE-WHITEBARK PINE-WESTERN WHITE PINE/SANDWORT CL-C1-12

ENVIRONMENT

Location: Warner Mts.
Elevation: 6400-8200 ft.
Aspect: Northerly
Percent Slope: (5) 20-50
Slope Position: Upper mid to top
Topography: Flat to convex; escarpments, ridges, basins

SOILS

Geology: Rhyolites
Grass Rooting Depth: 10-20 in.
Tree/Shrub Rooting Depth: 20-40 in.
Percent Stone: 10-50
Texture: Gravelly coarse sand to sandy loam
Special: Poorly developed soils

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Lodgepole pine	1-30	1-30	100	100	Climax
Whitebark pine	0-30	0-10	60	60	Climax
Western white pine	0-30	0-30	50	50	Seral with fire
White fir	0-30	0-30	60	70	Climax without fire
Wheeler's bluegrass		2-10		100	Increaser
Long-stolon sedge		0-10		95	Increaser
King's sandwort		0-10		80	Increaser

Ground Vegetation: Little diversity in either shrub or herb component, ground cover sparse and stands appear park-like. Majority of tree regeneration found along edges and openings. Occasional pinemat manzanita and sticky currant in more open or rocky places. Wheeler's bluegrass and long-stolon sedge found throughout the community.

Indicators: Presence of whitebark pine always indicates high elevation and potential severe microsites. Western white pine erratic in its distribution and appears to indicate a pattern of past wildfire. Long-stolon sedge often abundant in areas of disturbance; Davidson's penstemon and pinemat manzanita indicate rocky soils.

Silviculture: Low site productivity, **NONCOMMERCIAL.** Community dominated by strikingly short, limby trees in a shallow, rocky soil. Logging or fires may dramatically impact regeneration success where a period of regeneration establishment would exceed 5 years. Stockability for lodgepole pine is 65-103 sq. ft. BA/acre and 6-136 sq. ft. BA/acre for whitebark pine.

Revegetation: Extreme difficulty anticipated due to harsh environmental setting; perennial grass mix of orchardgrass, hard fescue, and alpine timothy recommended.

Problems Associated with Management: Short growing season; disturbed soil slow to stabilize. Western gall rust and dwarfmistletoe common in lodgepole pine. Hydrophobic soils preclude broadcast burning.

PRODUCTIVITY (15 plots)

	Site Index		TBA				GBA		Ft^3/yr Index	
	(LP)	(WBP)	(LP)	(WBP)	(WWP)	(WF)	(LP)	(WBP)	(LP)	(WBP)
Mean	42	35	84	18	25	28	84	71	20	15
5% CI	7	12	31	13	15	28	19	65	7	17

LODGEPOLE PINE/STRAWBERRY-FESCUE CL-G3-15

LODGEPOLE PINE/STRAWBERRY-FESCUE CL-G3-15

ENVIRONMENT

Location: West of Highway 395
Elevation: 5000-6200 ft.
Aspect: All aspects
Percent Slope: 2-7
Slope Position: Lower one-third to bottom of slope
Topography: Top of slopes, basins and flats

SOILS

Geology: Shallow ash over basalt, basalt
Grass Rooting Depth: 10-15 in.
Tree/Shrub Rooting Depth: 10-34 in.
Percent Stone: 0-50
Texture: Coarse sand to silty loam
Special: Pumice soils

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Lodgepole pine	10-70	10-50	100	100	Climax
Ponderosa pine	0-5	0-5	50	90	Seral
Strawberry		1-10		100	Increaser
Idaho fescue		0-30		80	Increaser
Ross' sedge		0-5		60	Increaser
Squirreltail		0-5		80	Increaser
Wheeler's bluegrass		0-5		80	Increaser

Ground Vegetation: Good plant diversity; abundant lodgepole pine regeneration; heavy ponderosa pine regeneration may be found locally. Lodgepole pine dominant where recently disturbed. Greatest bulk of herbaceous plants are grasses and sedges. Shrub component rather sparse but several species may be sparingly found on a site. Wax currant would be the most common shrub.

Indicators: Areas where regeneration is dominated by lodgepole pine should be managed principally for that species. Stands that possess ponderosa pine in both the overstory and understory may be cultured for either species, depending on the microsites; lodgepole pine should be used as a cover crop on the more harsh sites.

Silviculture: Moderately high lodgepole pine site productivity; abundant natural regeneration. Ponderosa pine regeneration apparent in areas where lodgepole pine served as a cover crop. White fir and western juniper occasional where ground fires absent. Stand offers a variety of potential treatments in terms of silvicultural options. Fairly diverse community that may not require planting on flat sites. Stockability for lodgepole pine is 112-158 sq. ft. BA/acre.

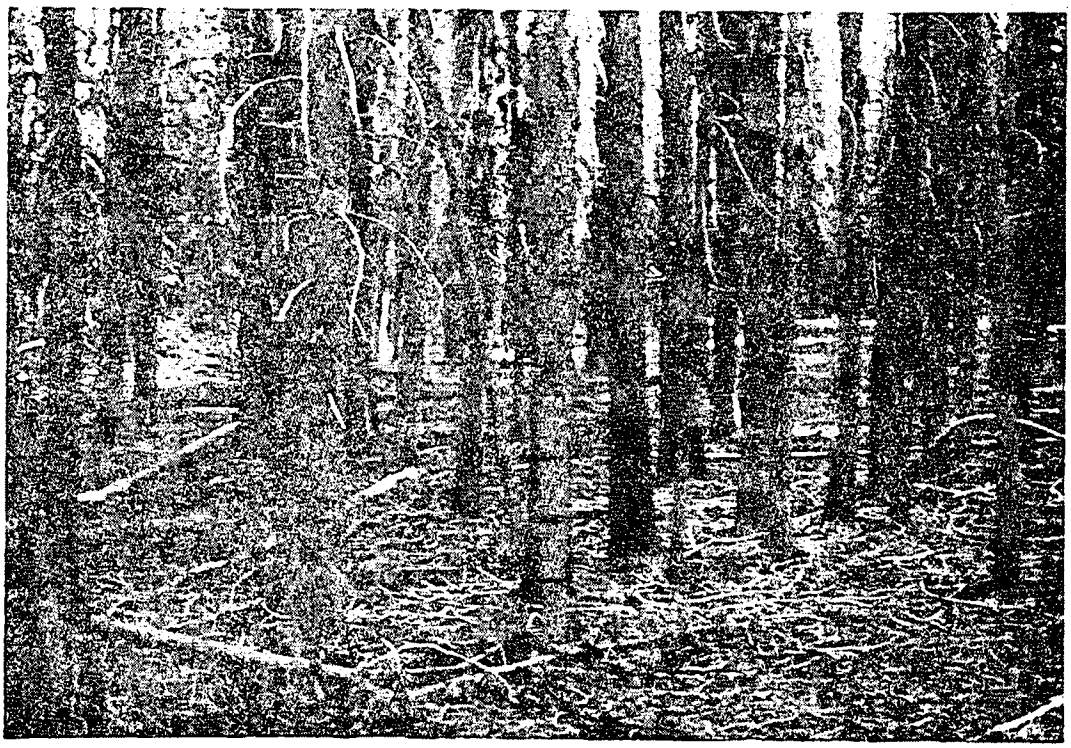
Problems Associated with Management: Dwarfmistletoe and western gall rust common; stalactiform rust often locally heavy. Pocket gopher locally heavy where abundant herbaceous vegetation occurs

PRODUCTIVITY (1 plots)

	Site Index (LP)	TBA (LP)	TBA (PP)	GBA (LP)	Ft³/Yr Index (LP)
Mean	73	149	6	135	54
5% CI	7	36	*	23	10

* Data too variable to provide a reasonable estimate.

LODGEPOLE PINE/SQUIRRELTAIL - LONG-STOLON SEDGE CL-G4-15



LODGEPOLE PINE/SQUIRRELTAIL-LONG-STOLON SEDGE CL-G4-15

ENVIRONMENT

Location: Paisley RD
Elevation: 5800-7000 ft.
Aspect: All aspects
Percent Slope: 0-20
Slope Position: Mid to upper one-third
Topography: Flat to convex sideslopes and gently rolling ridges

SOILS

Geology: Pumice, rhyolite
Grass Rooting Depth: 5-15 in.
Tree/Shrub Rooting Depth: 15-30 in.
Percent Stone: 0-50
Texture: Gravelly coarse sand
Special: Poorly developed soils; frost heaving

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Lodgepole pine	10-70	1-30	100	100	Climax
Long-stolon sedge		0-10		95	Increaser
Squirreltail		0-5		95	Increaser
Needlegrass		0-5		90	Increaser
Silvery lupine		0-10		75	Increaser
Strawberry		0-5		55	Increaser

Ground Vegetation: Low diversity in normally open stands. White fir regeneration may be present at 2-10 percent cover but never any mature trees. Occasional ponderosa pine old growth remnant. Wax currant is most obvious shrub species. In addition to the dominant species listed, linanthastrum, buckwheat, penstemon, Wheeler's bluegrass, kelloggia, and phlox would complete the list of major forbs. A diverse ground cover may be found along wetter concave areas within this type.

Indicators: Combination of long-stolon sedge, needlegrass and lupines indicate pumice soils. Long-stolon sedge and lupine prime food source for pocket gophers.

Silviculture: Low site productivity; extreme caution should be used in treatment of areas since community grades from commercial to **NONCOMMERCIAL** sites. Dwarfmistletoe, western gall rust, and stalactiform rust locally heavy; multiple tops also common. Natural or planted stock may be frost heaved or damaged by pocket gophers. Shelterwood may be required to modify microsite in order to establish regeneration. Stockability for lodgepole pine is 68-90 sq. ft. BA/acre.

Revegetation: Very harsh site at upper limits of community. Revegetation should not be attempted.

Problems Associated with Management: Failure to regenerate in short period will allow long-stolon sedge to occupy site and allow pocket gophers to increase. Short growing season, hydrophobic soils and poorly developed soils limit operations.

Productivity (21 plots)

	Site Index (LP)	TBA (LP)	GBA (LP)	Ft^3/Yr Index (LP)
Mean	66	131	79	29
5% CI	4	9	11	5

LODGEPOLE PINE-QUAKING ASPEN/STRAWBERRY CL-H1-11

LODGEPOLE PINE-QUAKING ASPEN/STRAWBERRY CL-H1-11

ENVIRONMENT

Location: All of Fremont
Elevation: 5000-7000 ft.
Aspect: West to northeast
Percent Slope: 1-10
Slope Position: Bottom of slopes, wet sites
Topography: Basins, flats, lower toeslopes

SOILS

Geology: Basalts, alluvium
Grass Rooting Depth: 10-25 in.
Tree/Shrub Rooting Depth: 20-36 in.
Percent Stone: 0-10
Texture: Loamy sands to clay
Special: Seasonally wet to perennial saturation of soils

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Lodgepole pine	10-70	5-30	100	100	Climax
Quaking aspen	0-5	1-30	50	100	Climax
Squirreltail		0-5		80	Increaser
Strawberry		0-5		70	Increaser
Wheeler's bluegrass		0-5		70	Increaser

Ground Vegetation: Highly diverse herbaceous cover associated with wetter sites. Spirea found in moderately moist sites. Lodgepole pine and quaking aspen regeneration normally abundant; white fir and ponderosa pine regeneration very sparse. Wheeler's bluegrass and bottlebrush squirreltail most abundant herbaceous plants. Strawberry, Idaho fescue, and yarrow are somewhat erratic in dispersal across this type depending on the degree of past disturbance and soil wetness.

Indicators: Presence of quaking aspen in the understory good indicator of stable site. Western juniper and white fir imply absence of ground fires. Spirea present on wetter sites and will increase following a disturbance.

Silviculture: High site productivity: lodgepole pine is successional with quaking aspen being somewhat stable in terms of community dynamics. Scarification of native vegetation important in this diverse community but care must be exercised to not cause excessive soil compaction or soil displacement. Abundant natural lodgepole pine found on most sites. Stockability for lodgepole pine ranges between 111-249 sq. ft. BA/acre.

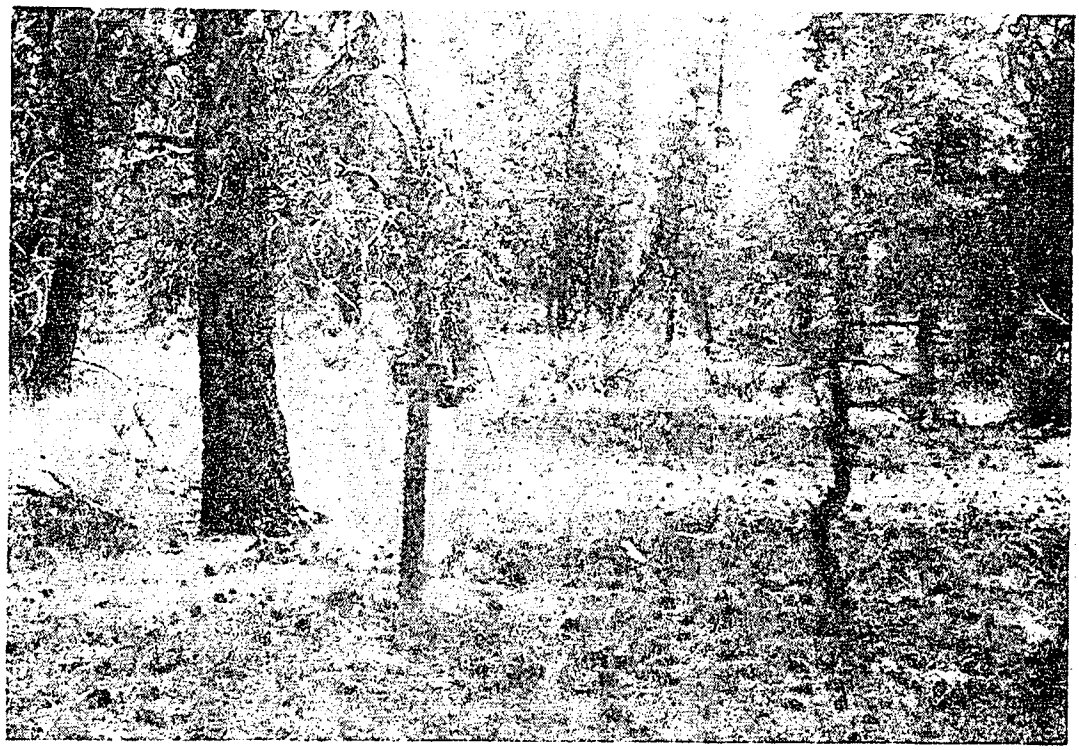
Revegetation: Usually not necessary. Seed mix of orchardgrass, meadow foxtail or tall fescue suggested.

Problems Associated with Management: Multiple stems, dwarfmistletoe, and western gall rust common. Soil easily compacted and displaced. Critical spring fawning and summer range for mule deer.

PRODUCTIVITY (6 plots)

	Site Index (LP)	TBA (LP)	GBA (LP)	Ft^3/Yr Index (LP)
Mean	79	203	180	77
5% CI	10	76	69	25

PONDEROSA PINE-JUNIPER/MOUNTAIN-MAHOGANY - BITTERBRUSH -
BIG SAGEBRUSH/FESCUE CP-C2-11



PONDEROSA PINE-JUNIPER/MOUNTAIN-MAHOGANY-BITTERBRUSH-BIG SAGEBRUSH/FESCUE
CP-C2-11

ENVIRONMENT

Location: All of Fremont
Elevation: 4800-5900 ft.
Aspect: All aspects
Percent Slope: 2-30
Slope Position: Lower to upper one-third
Topography: Convex, flat, and concave, sideslopes and ridgetops

SOILS

Geology: Basalts, andesite, colluvium
Grass Rooting Depth: 5-13 in.
Tree/Shrub Rooting Depth: 18-36 in.
Percent Stone: 10-75
Texture: Sandy loam to sandy clay
Special: Upper horizons pumice and well-drained

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Ponderosa pine	5-50	5-60	100	100	Major climax
Western juniper	0-5	0-10	15	80	Minor climax
Basin big sagebrush		1-60		100	Increaser
Bitterbrush		0-40		95	Increaser
Mountain-mahogany		0-30		70	Increaser
Squirreltail		0-30		95	Increaser
Idaho fescue		0-50		70	Increaser

Ground Vegetation: Big sagebrush and bitterbrush dominate the shrub layer; western junipe and mountain-mahogany are common. Common herbaceous plants are bottlebrush squirreltai Idaho fescue, western needlegrass, and yarrow. Gray rabbitbrush is common on sites in Paisle and Silver Lake Districts.

Indicators: Big sagebrush indicates shallow soils. Sites with less than 26 inches of soil on sout slopes may be **NONCOMMERCIAL.**

Silviculture: Moderately high commercial site. Shelterwood or overstory removal best wher advanced regeneration is present. Windthrow possible on sites with shallow soil. South slope tend to be marginal to **NONCOMMERCIAL** sites. Fescue and long-stolon sedge may be sever competitors for planted stock if they are well established. Excellent potential for livestock range Stockability for ponderosa pine is 72-144 sq. ft. BA/acre.

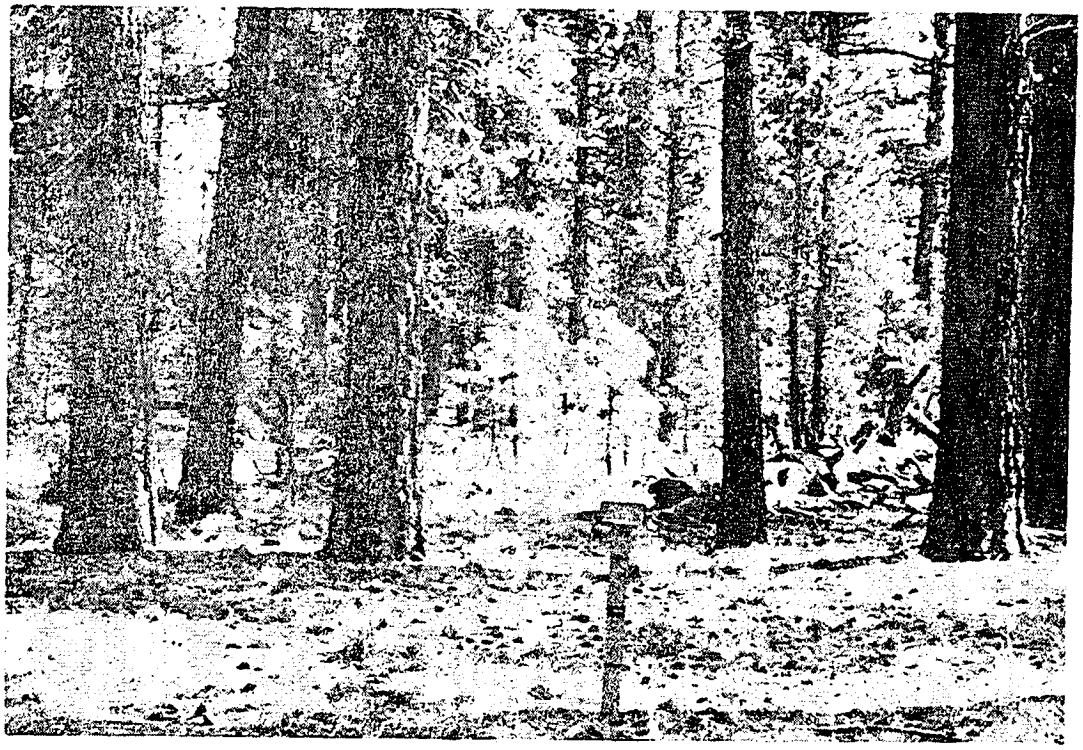
Revegetation: Fair to good success when seeded with drought tolerant grasses; crested, inter mediate, or pubescent wheatgrass, hard fescue, and mountain or smooth brome. Some stands c sagebrush and bitterbrush should be retained as this type is prime fall, winter, and sprin mule deer and antelope habitat.

Problems Associated with Management: Manager must identify and separate **COMMERCIAL** V **NONCOMMERCIAL** stands within this type. Large openings (clearcuts) will stimulate shrub an herbaceous vegetation. Dwarfmistletoe locally a problem. Gray rabbitbrush can become problem on disturbed sites.

PRODUCTIVITY (13 plots)

	Site Index (PP)	TBA (PP)	GBA (PP)	Ft^3/Yr Index (PP)
Mean	76	128	108	47
5% CI	5	34	36	18

PONDEROSA PINE/BITTERBRUSH/FESCUE CP-S2-11



PONDEROSA PINE/BITTERBRUSH/FESCUE CP-S2-11

ENVIRONMENT

Location: All of Fremont
Elevation: 4700-5500 ft.
Aspect: Southwest to north
Percent Slope: 1-30
Slope Position: Mid one-third to bottom
Topography: Bottoms, sideslopes and ridges

SOILS

Geology: Ash over basalt or andesite
Grass Rooting Depth: 4-10 in.
Tree/Shrub Rooting Depth: 18-38 in.
Percent Stone: 2-60
Texture: Coarse sand to sandy clay loam
Special: Pumice soils; surface horizons well-drained

VEGETATION

Dominants	% Cover OS	% Cover US	Constancy OS	Constancy US	Status
Ponderosa pine	5-60	5-60	100	100	Major climax
Western juniper	0-10	0-10	10	70	Minor climax
Mountain-mahogany		0-10		70	Increaser
Bitterbrush		0-50		90	Increaser
Idaho fescue		0-40		90	Increaser
Squirreltail		0-5		90	Increaser

Ground Vegetation: Bitterbrush is dominant shrub species; western juniper and mountain-mahogany occur locally. Lodgepole pine occasionally subordinant. Idaho fescue and bottlebrush squirreltail are dominant herbaceous species. Common herbaceous plants are strawberry, Ross' sedge, Wheeler's bluegrass, and long-stolon sedge. Bittercherry, squawcarpet, and wooly wyethia are found in this type on Bly and Lakeview Districts.

Indicators: Western juniper and mountain-mahogany indicate shallow or well-drained pumice soil.

Silviculture: Moderately high site productivity. Overstory removal or shelterwood treatment is best with interplanting where regeneration is sparse and thinning where the understory is in stagnated thickets. Highly disturbed sites may require control of fescue or long-stolon sedge. Auger planting is recommended for best establishment. Best productivity is found on west to north slope. Regeneration of trees is difficult if not accomplished well in advance of summer drought. Stockability for ponderosa pine is 89-125 sq. ft. BA/acre.

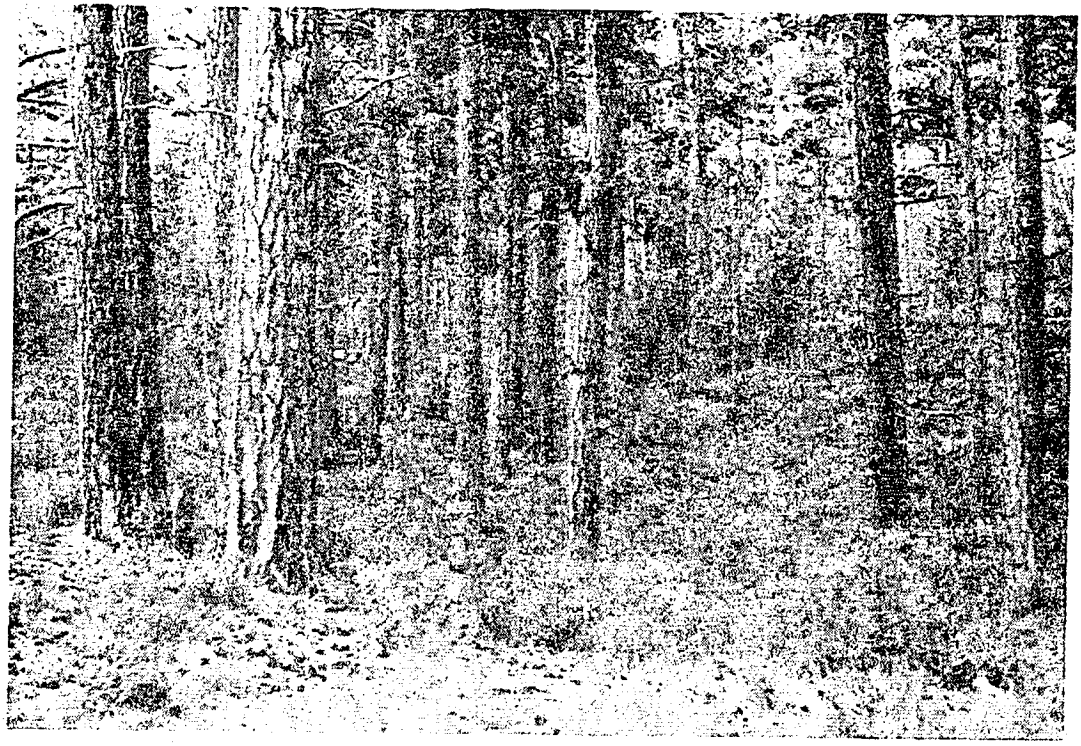
Revegetation: Maintain bitterbrush for livestock and mule deer forage and protective cover for natural or planted regeneration. Grass seeding success is fair to good with mixtures of crested and intermediate wheatgrass, hard fescue, and Russian wildrye.

Problems Associated with Management: Shrub and herbaceous vegetation may require control following logging activity; dwarfmistletoe infestations locally heavy; compaction of moist soils possible in spring and early summer.

PRODUCTIVITY (23 plots)

	Site Index (PP)	TBA (PP)	GBA (PP)	Ft^3/Yr Index (PP)
Mean	77	178	107	47
5% CI	4	22	18	14

PONDEROSA PINE/BITTERBRUSH-MANZANITA/FESCUE CP-S2-17



PONDEROSA PINE/BITTERBRUSH-MANZANITA/FESCUE CP-S2-17

ENVIRONMENT

Location: All of Fremont
Elevation: 4800-6000 ft.
Aspect: All except east
Percent Slope: 2-25
Slope Position: Lower to upper one-third
Topography: Convex, flat, and concave, ridgetops and rolling terrains

SOILS

Geology: Pumice over basalt and andesite
Grass Rooting Depth: 4-9 in.
Tree/Shrub Rooting Depth: 16-36 in.
Percent Stone: 2-50 (75)
Texture: Gravelly loam to clay
Special: Pumice in profiles 10-20 in. deep

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Ponderosa pine	10-70	2-60	100	100	Major climax
Western juniper	0-5	0-5	5	70	Minor climax
Bitterbrush		1-40		100	Increaser
Greenleaf manzanita		1-40		100	Increaser
Squawcarpet		0-30		60	Increaser
Mountain-mahogany		0-20		60	Increaser
Squirreltail		1-40		100	Increaser
Strawberry		0-10		95	Increaser
Ross' sedge		0-10		75	Increaser
Idaho fescue		0-50		60	Increaser

Ground Vegetation: Shrub layer dominated by bitterbrush and manzanita; squawcarpet, snowbrush, and gray rabbitbrush are locally common to codominant. Western juniper is often found as understory regeneration and occasionally a low cover of white fir is present. Western needlegrass is usually found in conjunction with the white fir understory. Common herbaceous plants include strawberry, squirreltail, Ross' sedge, Wheeler's bluegrass, yarrow and Idaho fescue.

Indicators: Manzanita and bitterbrush together indicate poorly drained soils (average 24 inches deep with clayey B horizon). Presence of white fir regeneration indicates a drop in site productivity. Loss of bitterbrush in the shrub layer indicates an increase in site productivity. This latter group can be with or without white fir present in understory and/or overstory. This community type readily intergrades with ponderosa pine-white fir sites.

Silviculture: Moderately high site productivity. Shelterwood or overstory removal are best cultural treatments in pure ponderosa pine stands with advanced regeneration. On more moist sites with advanced white fir regeneration, small clearcuts and planting necessary for satisfactory re-establishment of ponderosa pine. Stockability for ponderosa pine ranges from 107-145 sq. ft. BA/acre.

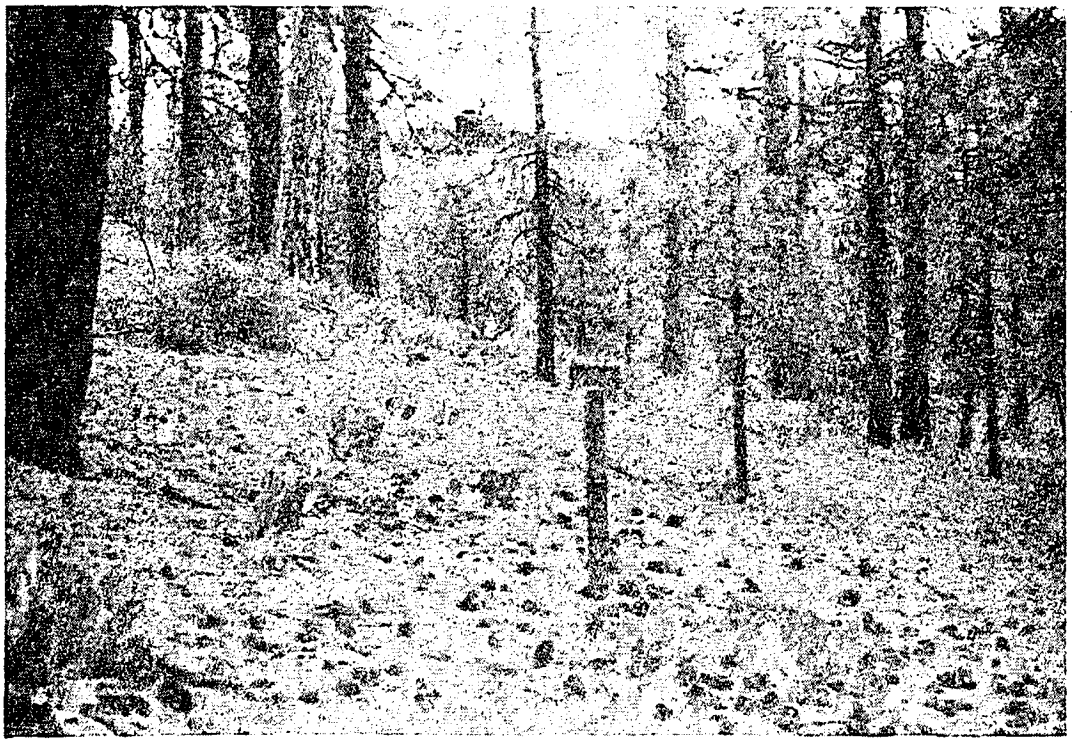
Revegetation: Maintain bitterbrush as a source of browse in most areas. Seeding domestic grasses not recommended: pubescent wheatgrass and intermediate wheatgrass or hard fescue preferred.

Problems Associated with Management: Manzanita, gray rabbitbrush, Idaho fescue, and white fir may be stimulated by release. Dwarfmistletoe locally a problem. Shallow soils can not withstand much logging disturbance. Upper soil horizons are sandy and well drained; may reduce success in establishing plantations.

PRODUCTIVITY (13 plots)

	Site Index (PP)	TBA (PP)	GBA (PP)	Ft^3/Yr Index (PP)
Mean	77	167	126	54
5% CI	3	24	19	9

PONDEROSA PINE/WOOLY WYETHIA CP-F1-11



ENVIRONMENT

Location: Bly and Lakeview Ranger District, west of Highway 395
Elevation: 5000-6400 ft.
Aspect: All aspects
Percent Slope: 5-40
Slope Position: Upper to lower one-third
Topography: Gentle rolling flats with convex character

SOILS

Geology: Andesite, basalt, rhyolite
Grass Rooting Depth: 6-11 in.
Tree/Shrub Rooting Depth: 15-30 in.
Percent Stone: 5-60
Texture: Gravelly silt loam to gravelly clay
Special: Soils easily fluffed; well-drained with gravels. Compaction on clayey soils possible

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Ponderosa pine	10-40	5-50	100	100	Major climax
Western juniper	0-10	0-10	10	80	Minor climax
White fir	0-1	0-10	5	70	Minor climax
Bitterbrush		0-30		70	Increaser
Serviceberry		0-10		60	Increaser
Squawcarpet		0-60		50	Increaser
Wooly wyethia		1-30		100	Increaser
Squirreltail		0-10		95	Increaser
Yarrow		0-10		80	Increaser
Wheeler's bluegrass		0-10		75	Increaser
White hawkweed		0-10		75	Increaser

Ground Vegetation: A variety of brush species may be present on a given site and may include squawcarpet, snowbrush, Oregon grape, mountain-mahogany, basin big sagebrush, bitterbrush, and manzanita. Western juniper present in most stands as a seedling or sapling; white fir regeneration usually more abundant toward the middle or upper elevational limits of the community with incense cedar being found on the more open or dry sites. Some of the more important herbaceous plants, in addition to those mentioned under "Dominants" include: silvery lupine, Ross' sedge, strawberry, long-stolon sedge, and heartleaf arnica. Stands are rarely highly diverse floristically and **USUALLY** appear as disturbed sites due to the presence of stumps or disturbed soils.

Indicators: Wooly wyethia always present and may be in excess of 50 percent ground cover on recently (3-5 years) disturbed sites. Serviceberry usually present in stands and may be limited to areas directly under existing canopies on recently disturbed sites.

Silviculture: Moderately productive for ponderosa pine on average site. Shelterwoods best suited for site due to site dominating potential of the wooly wyethia. Abundant advanced regeneration of ponderosa pine on majority of sites; white fir advance regeneration may also be cultured on the upper limits of the community. Most stands are OVERSTOCKED in both the old residual trees and the regeneration. Usually sufficient natural tree regeneration in stands. Site will slow down in growth very rapidly on drier sites if stocking level is not controlled. Stockability for ponderosa pine is 77-123 sq. ft. BA/acre.

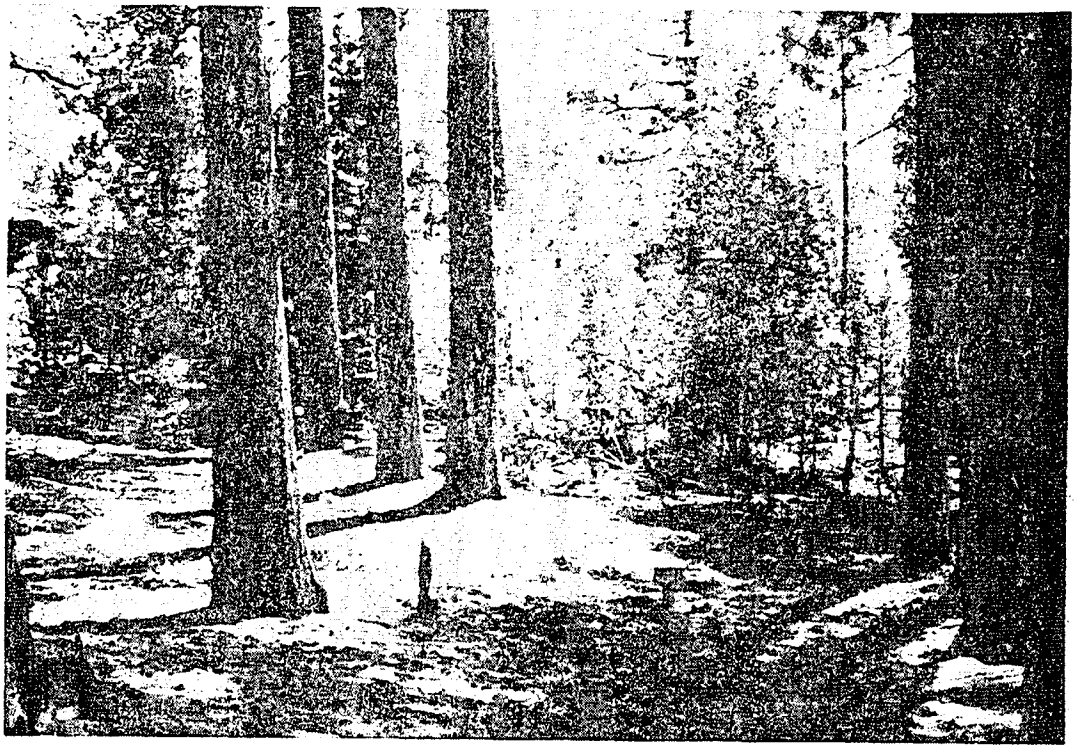
Revegetation: Wooly wyethia and a variety of brush species will quickly dominate site if not treated or managed against via timely planting or grazing. Domestic seed mix of hard fescue and orchardgrass suggested.

Problems Associated with Management: Clear cutting or vast openings in the stands allow a variety of shrubs and herbaceous plants to occupy ground cover and create problems with tree regeneration and desirable grass establishment.

PRODUCTIVITY (16 plots)

	Site Index (PP)	TBA (PP)	GBA (PP)	Ft^3/Yr Index (PP)
Mean	78	148	100	44
5% CI	4	23	23	11

PONDEROSA PINE-QUAKING ASPEN/BLUEGRASS CP-H3-11



PONDEROSA PINE-QUAKING ASPEN/BLUEGRASS CP-H3-11

ENVIRONMENT

Location: Silver Lake, Paisley, and Lakeview Districts
Elevation: 5500-6900 ft.
Aspect: All aspects
Percent Slope: 2-15 (20)
Slope Position: Upper one-third to ridgetops and bottoms
Topography: Concave to flat ridgetops

SOILS

Geology: Colluvium overlain with ash
Grass Rooting Depth: 5-10 in.
Tree/Shrub Rooting Depth: 22-30 in.
Percent Stone: 5-60
Texture: Silty loam to sandy clay
Special: Seasonally wet soil subject to compaction; perennially high water table

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Ponderosa pine	5-30	10-70	100	100	Climax
Quaking aspen	0-50	0-20	25	90	Climax
Western juniper	0	0-10	0	60	Increaser
Long-stolon sedge		0-20		90	Increaser
Wheeler's bluegrass		0-30		90	Increaser
Yarrow		0-5		75	Increaser
Squirreltail		0-5		75	Increaser

Ground Vegetation: No dominant shrub layer, although commonly some mountain big sagebrush, serviceberry, creeping snowberry, Oregon grape, or wax currant present. Herbaceous layer dominated by Wheeler's bluegrass and long-stolon sedge. Other common herbaceous plants are bottlebrush squirreltail, yarrow, Idaho fescue, and strawberry. Western juniper is common in the tree understory, with occasional lodgepole pine or white fir also in the understory.

Indicators: Lush vegetation adjacent to streambanks in bottoms with internal drainage. Soil surface wet in spring and early summer; water table near or at surface year around.

Silviculture: Moderately high site productivity. Selective cutting or light shelterwoods preferred; soils are sensitive to logging-related disturbances. Saturated soils may make regeneration difficult. Planted stock may only establish successfully around drier, better drained edges of the type. Stockability for ponderosa pine is 85-163 sq. ft. BA/acre.

Revegetation: Usually not required due to abundant native ground vegetation. Suggested grasses are orchardgrass, timothy, meadow foxtail, perennial ryegrass or reed canarygrass.

Problems Associated with Management: Wet soils highly subject to compaction; removal of aspen may cause water table to raise, changing site to wet meadow. Usually excellent sites for water development for use by livestock or wildlife. Overgrazed or logged areas may become dominated by falsehellebore.

PRODUCTIVITY (8 plots)

	Site Index (PP)	TBA (PP)	GBA (PP)	Ft^3/Yr Index (PP)
Mean	78	165	124	55
5% CI	6	44	39	21

PONDEROSA PINE/MOUNTAIN BIG SAGEBRUSH/BLUEGRASS CP-S1-21

PONDEROSA PINE/MOUNTAIN BIG SAGEBRUSH/BLUEGRASS CP-S1-21

ENVIRONMENT

Location: Silver Lake, Paisley, and Lakeview Districts
Elevation: 5800-7000 ft.
Aspect: South to northwest (east)
Percent Slope: 1-25
Slope Position: Lower to upper one-third
Topography: Flat to convex, ridgetops

SOILS

Geology: Ash over basalt, andesite, and loess
Grass Rooting Depth: 5-12 in.
Tree/Shrub Rooting Depth: 20-36 in. (50)
Percent Stone: 0-80
Texture: Sandy loam to sandy clay loam
Special: Pumice mixed in all horizons; soil generally deeper than other ponderosa pine sites.

VEGETATION

Dominants	% Cover OS	% Cover US	Constancy OS	Constancy US	Status
Ponderosa pine	5-50	5-50	100	100	Major climax
Western juniper	0	0-10	0	50	Minor climax
Mountain big sagebrush		0-60		95	Increaser
Snowberry		0-10		70	Increaser
Wax currant		0-20		60	Increaser
Wheeler's bluegrass		0-30		95	Increaser
Silvery lupine		0-40		95	Increaser
Yarrow		0-10		95	Increaser
Squirreltail		0-20		90	Increaser

Ground Vegetation: This community is dominated in the understory by mountain big sagebrush, the high elevation subspecies of big sagebrush. Western juniper is common in the understory; lodgepole pine and white fir are found as regeneration on some sites. Besides the dominants listed above, common understory herbaceous species include long-stolon sedge, Idaho fescue, strawberry, and white hawkweed.

Indicators: The presence of western juniper indicates a lower than average site productivity, whereas lodgepole pine and white fir indicate above average sites. Gray rabbitbrush, long-stolon sedge and bottlebrush squirreltail increase with site disturbance.

Silviculture: Moderately high site productivity. Best treatments are overstory removal or selective cuts with planting in relatively understocked areas. All advanced natural regeneration should be retained except on sites with severe dwarfmistletoe infestation. Sites with very high sagebrush canopy cover should be opened up, but not eliminated as this subspecies of big sagebrush is readily used for forage by mule deer. Control of long-stolon sedge may be necessary on some sites following logging and failure to regenerate. Stockability for ponderosa pine is 71-127 sq. ft. BA/acre.

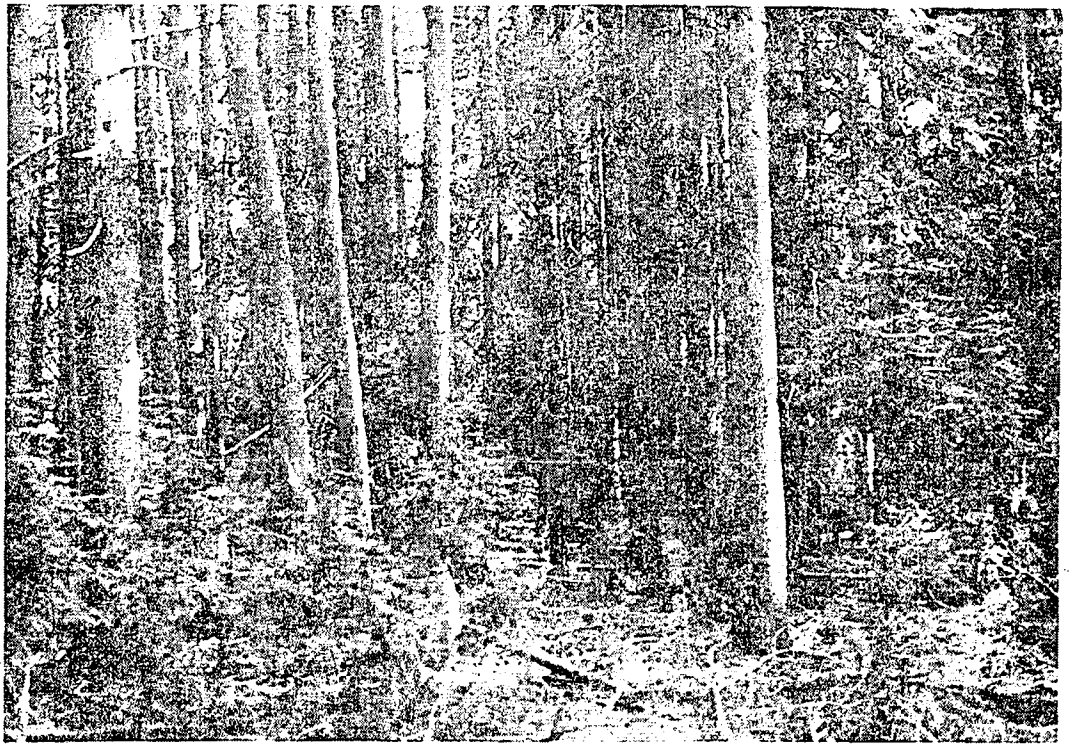
Revegetation: Good to excellent success from seeding grasses; use orchardgrass, timothy, and perennial ryegrass where livestock grazing can be tolerated, and seed hard fescue among the native Idaho fescue where grazing is to be discouraged. Rhizomatous or sod forming grasses, such as wheatgrasses and smooth brome will suppress tree seedlings, planted or natural.

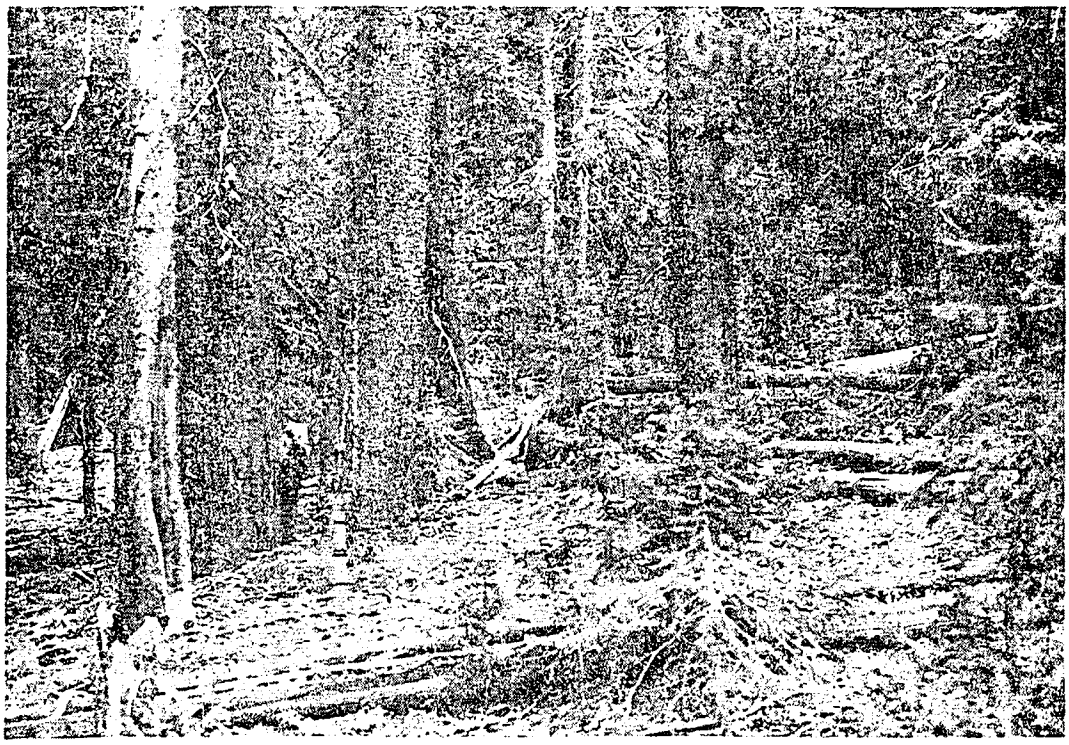
Problems Associated with Management: Lowest sites within this community are **NONCOMMERCIAL**, manager must recognize these before prescribing any cuts or treatments. Competition from released long-stolon sedge can be severe; high sagebrush canopy cover may decrease early growth of relatively intolerant ponderosa pine seedlings.

PRODUCTIVITY (14 plots)

	Site Index (PP)	TBA (PP)	GBA (PP)	Ft³/Yr Index (PP)
Mean	76	139	99	42
5% CI	4	33	28	14

WHITE FIR-LODGEPOLE PINE/LONG-STOLON SEDGE - NEEDLEGRASS
CW-C3-11





WHITE FIR-LODGEPOLE PINE/LONG-STOLON SEDGE-NEEDLEGRASS CW-C3-11

ENVIRONMENT

Location: All of Fremont
Elevation: 5500-7400 ft.
Aspect: All aspects
Percent Slope: 2-30
Slope Position: Lower to upper one-third slopes
Topography: Ridges and sideslopes

SOILS

Geology: Andesites, basalts, and ash
Grass Rooting Depth: 14 in.
Tree/Shrub Rooting Depth: 40 + in.
Percent Stone: 5-50
Texture: Loamy sands
Special: Poorly developed soils, frost heaving

VEGETATION

Dominants	% Cover OS	% Cover US	Constancy OS	Constancy US	Status
Lodgepole pine	10-70	1-30	100	100	Climax
White fir	0-30	1-30	60	100	Climax
Long-stolon sedge		0-30		80	Increaser
Squirreltail		0-5		80	Increaser
Needlegrass		0-5		70	Increaser
Wheeler's bluegrass		0-10		65	Increaser
Linanthastrum		0-10		55	Increaser

Ground Vegetation: Moderate plant diversity on the ground. The most prominent feature being grasses and sedges collectively. Lodgepole pine and white fir regeneration share dominance. The more common herbaceous plants, other than grasses and sedges, are lupines and linanthastrum. The most important shrub is wax currant with several other species of shrubs being present but never in any significant amount. Areas near streams exhibit a diverse forb component. White fir old growth remnants and abundant regeneration due to absence of periodic fire.

Indicators: Combination of white fir and lodgepole pine in the absence of whitebark pine indicates this mid to upper slope community. Linanthastrum usually restricted to slopes with ash soils. Lupines indicate greater dominance of lodgepole pine over white fir. Presence of ponderosa pine regeneration implies lower limits of community.

Silviculture: Moderate to high site productivity considering the management alternatives for dealing with both lodgepole pine and white fir. Lodgepole pine will always act as a successional species but is quickly overtaken by white fir regeneration. Selective logging may encourage the faster growing white fir but caution is always extended in terms of care to not damage the crop trees. Soils are not very well developed and must not be overly disturbed. Should have good success in planting lodgepole pine. Stockability for lodgepole pine is 96-146 sq. ft. BA/acre and 105-309 sq. ft. BA/acre for white fir.

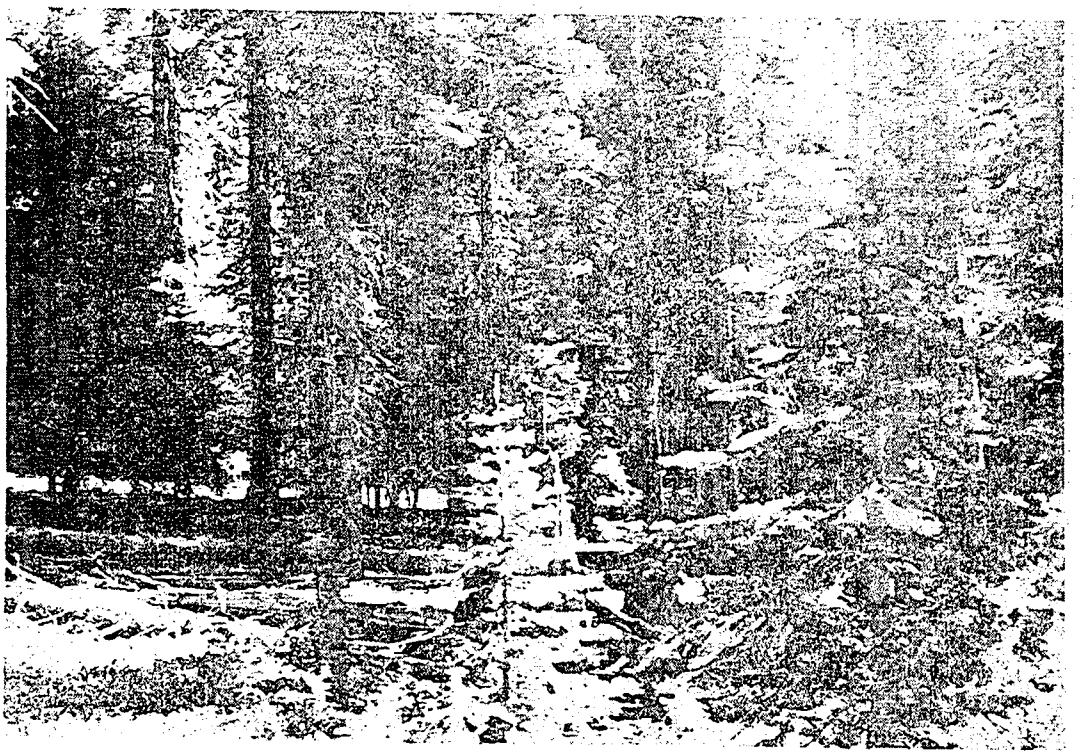
Revegetation: Orchardgrass, smooth brome, and hard fescue suggested for road construction seeding or soil stabilization.

Problems Associated with Management: Shallow poorly developed soils easily eroded. Pockets of clay substrate in localized areas. Should keep entries at minimum due to rather severe micro-sites. Potential pocket gopher problem in areas left for naturals. Long-stolon sedge and lupines will increase with disturbance.

PRODUCTIVITY (24 plots)

	Site Index (LP)	Site Index (WF)	TBA (LP)	TBA (WF)	GBA (LP)	GBA (WF)	Ft^3/Yr Index (LP)	Ft^3/Yr Index (WF)
Mean	67	77	121	47	121	207	45	88
5% CI	3	5	24	28	25	102	10	43

WHITE FIR-PONDEROSA PINE/SNOWBERRY/STARWORT CW-S3-13



WHITE FIR-PONDEROSA PINE/SNOWBERRY/STARWORT CW-S3-13

ENVIRONMENT

Location: All of Fremont
Elevation: 5100-7100 ft.
Aspect: All aspects
Percent Slope: 5-50
Slope Position: Lower to upper one-third
Topography: Flats to sideslopes

SOILS

Geology: Tuffs, breccias, basalts, and rhyolites
Grass Rooting Depth: 16-18 in.
Tree/Shrub Rooting Depth: 30-35 in.
Percent Stone: 2-50
Texture: Gravelly silty loam
Special: Gravelly or sandy soils highly erodible on steep slopes

VEGETATION

Dominants	% Cover OS	% Cover US	Constancy OS	Constancy US	Status
Ponderosa pine	5-50	0-30	97	95	Climax
White fir	5-50	5-50	99	100	Climax
Lodgepole pine	0-5	0-5	26	26	Seral
Snowberry		0-30		64	Increaser
Arnica		0-30		63	Increaser
Wheeler's bluegrass		0-20		86	Increaser
Squirreltail		0-5		60	Increaser
Long-stolon sedge		0-10		74	Increaser
Starwort		0-10		80	Decreaser

Ground Vegetation: Wide ranging community found on a variety of diverse landforms. Most diverse community on Forest in terms of floristics. Both common snowberry and creeping snowberry may be found on stand. Common snowberry found more commonly in Warner Mountains. Oregon grape, sticky currant, and serviceberry are other commonly found shrubs. Major forbs include Wheeler's bluegrass, heartleaf arnica, starwort, and long-stolon sedge.

Indicators: Heartleaf arnica, starwort, long-stolon sedge and Wheeler's bluegrass found throughout most stands. Abundant squirreltail and long-stolon sedge associated with past disturbance. Combination of heartleaf arnica and snowberries indicate good fir site.

Silviculture: Highly productive site for both ponderosa pine and white fir. Normally abundant advanced regeneration of ponderosa pine and white fir. Thinning recommended in order to realize maximum growth. Clearcuts favor ponderosa pine while light selective cuts will encourage white fir. Ponderosa pine best cultured on lower slope positions where rocky dry sites apparent. Upper limits of community may best be cultured for white fir; however, both species may be equally cultured at most mid to lower slope positions. Site preparation may be required on some sites where shrub or herbaceous competitors established. Stockability for ponderosa pine is 125-147 sq. ft. BA/acre and 220-260 sq. ft. BA/acre for white fir.

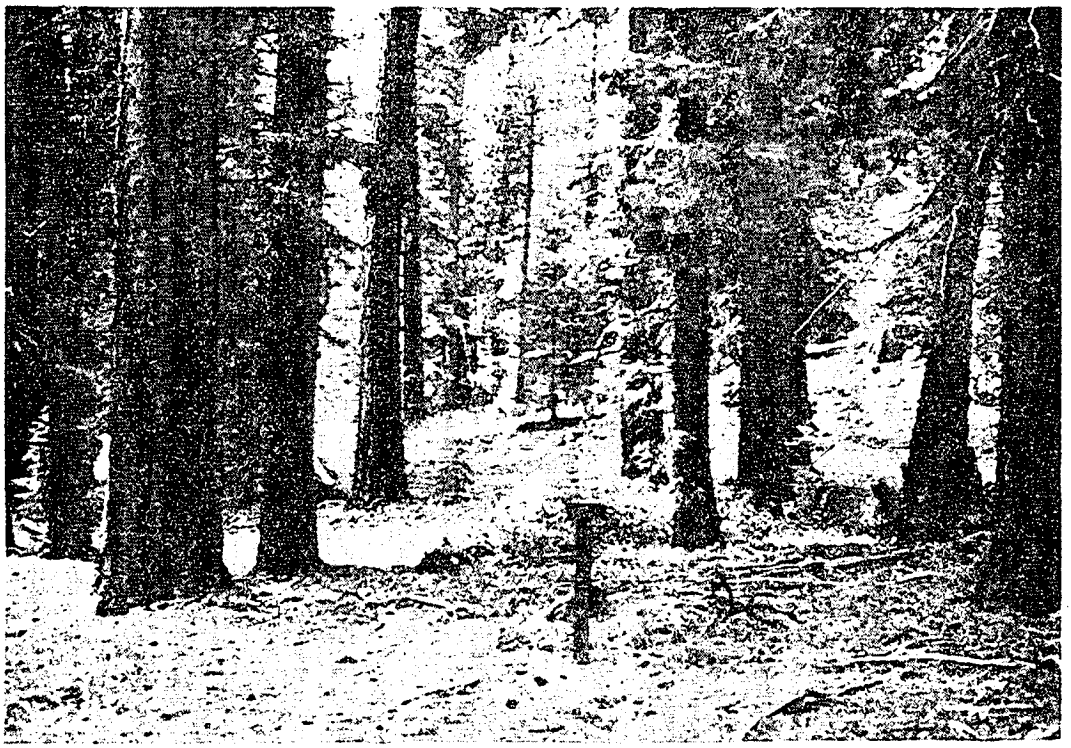
Revegetation: On flat ground and lower slope positions revegetation may not be required. On steep slopes a winter hardy annual may be desirable to quickly stabilize soils. A perennial seed mix of orchardgrass, hard fescue, and intermediate wheatgrass suggested.

Problems Associated with Management: Potential brush problem on most sites if not quickly regenerated. Long-stolon sedge aggressive on most sites. Dwarfmistletoe present in pines; old growth white fir often highly defective.

PRODUCTIVITY (81 plots)

	Site Index (PP)	Site Index (WF)	TBA (PP)	TBA (WF)	GBA (PP)	GBA (WF)	Ft^3/Yr Index (PP)	Ft^3/Yr Index (WF)
Mean	80	88	85	122	136	240	61	116
5% CI	2	2	8	13	11	20	5	11

WHITE FIR-PONDEROSA PINE/MANZANITA-OREGON GRAPE CW-S1-17



ENVIRONMENT

Location: West of Highway 395
Elevation: 5000-6500 ft.
Aspect: All aspects
Percent Slope: 5-40
Slope Position: Lower to upper one-third
Topography: Flat to convex sideslopes and major ridges

SOILS

Geology: Tuffs, breccias, basalts, rhyolite
Grass Rooting Depth: 6-18 in.
Tree/Shrub Rooting Depth: 20-36 in.
Percent Stone: 0-30
Texture: Sandy loam to sandy clay loam
Special: Texture of surface horizons is weak, fine granular, very easily displaced by disturbance

VEGETATION

Dominants	% Cover OS	% Cover US	Constancy OS	Constancy US	Status
Ponderosa pine	5-30	1-50	100	100	Climax
White fir	0-30	5-50	85	100	Climax
Manzanita		1-30		100	Increaser
Oregon grape		0-0		85	Increaser
Snowberry		0-30		65	Increaser
Wheeler's bluegrass		0-30		70	Increaser
Bottlebrush squirreltail		0-10		80	Increaser
Strawberry		0-10		70	Increaser
Long-stolon sedge		0-30		70	Increaser

Ground Vegetation: Highly diverse ground cover with both shrubs and forbs sharing equal dominance in stable stands. Squawcarpet, snowberry, and snowbrush can be found in a majority of the stands but they are not as common as manzanita or Oregon grape. A varied herbaceous cover can be found in most stands. Important sedges include both Ross' sedge and long-stolon sedge with Wheeler's bluegrass, squirreltail, and needlegrass being the prominent grasses. Hairy hawkweed, heartleaf arnica, dogbane, and strawberry are the most important forbs. A number of other herbaceous plants may be anticipated on a given site: their abundance appears to be related to the degree of past stand disturbance. Linanthastrum present at high elevations: lodgepole pine regeneration may be scattered across the stand.

Indicators: Abundant advanced white fir regeneration associated with past selective logging or absence of fire. Manzanita often associated with south aspects and somewhat dry rocky soil conditions during growing season. Ponderosa pine more abundant in downslope positions and white fir more prominent in mid to upper slope position.

Silviculture: Moderately high site production associated with this community. Natural regeneration often locally heavy and clearly dominated by white fir on most aspects. Ponderosa pine best cultured on drier parts of stand. Clearcutting favors ponderosa pine regeneration while selective cutting or light shelterwood favors white fir. Culturing of ponderosa pine and white fir desirable on most sites. Opportunity for thinning in white fir thickets. Stockability of ponderosa pine is 85-121 sq. ft. BA/acre while the stockability for white fir is 165-335 sq. ft. BA/acre.

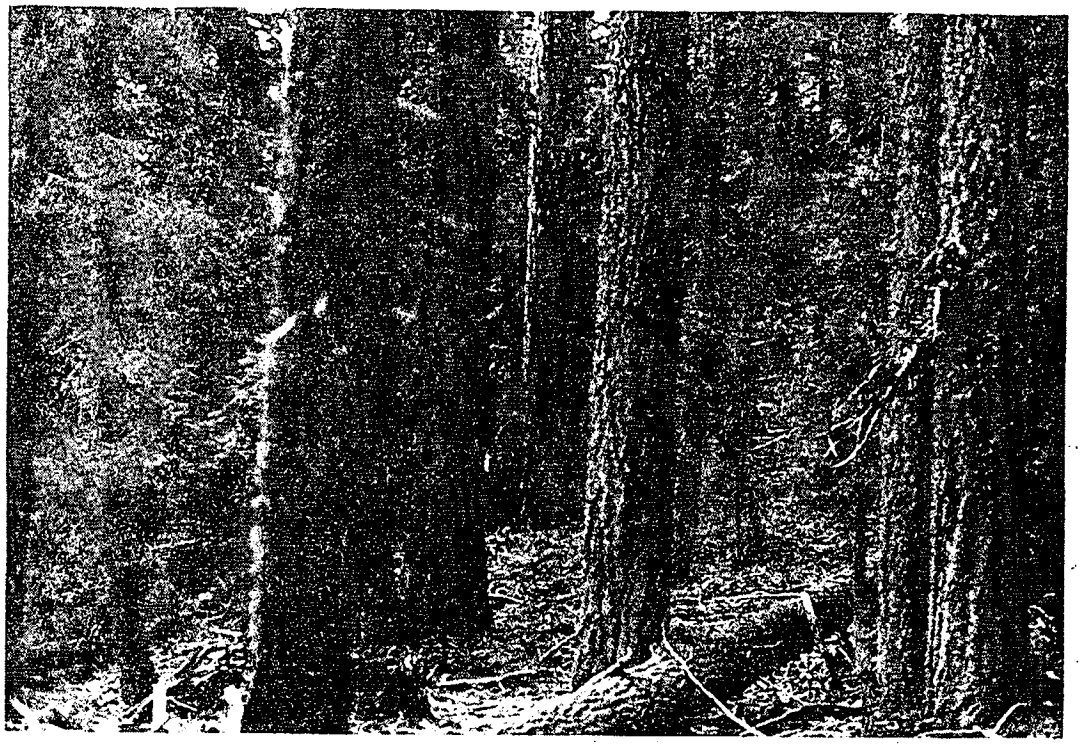
Revegetation: Should have good success in revegetating most areas. Perennial seed mix of orchardgrass and timothy recommended.

Problems Associated with Management: Manzanita and other species of brush may be severe competitors once stands are opened and soil is disturbed. Abundant ground vegetation may require site preparation for planting. Some sites fairly steep with rocky surface that will be difficult to stabilize if disturbed. White fir old growth often highly defective. Damaged young white fir should be harvested. Ponderosa pine infected with dwarfmistletoe.

PRODUCTIVITY (22 plots)

	Site Index (PP)	Site Index (WF)	TBA (PP)	TBA (WF)	GBA (PP)	GBA (WF)	Ft^3/Yr Index (PP)	Ft^3/Yr Index (WF)
Mean	80	93	92	61	103	250	46	131
5% CI	3	10	13	25	18	85	9	51

WHITE FIR-PONDEROSA PINE-SUGAR PINE/MANZANITA CW-C4-12



WHITE FIR-PONDEROSA PINE-SUGAR PINE/MANZANITA CW-C4-12

ENVIRONMENT

Location: West of Highway 395
Elevation: 5300-6100 ft.
Aspect: All aspects
Percent Slope: 5-50
Slope Position: Lower to upper one-third
Topography: Sideslopes, convex flats

SOILS

Geology: Tuffs, breccias, rhyolites, and basalts
Grass Rooting Depth: 14 in.
Tree/Shrub Rooting Depth: 25 in.
Percent Stone: 2-20
Texture: Loams
Special: Well drained soils somewhat shallow or convex landform

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
White fir	5-30	2-50	92	100	Climax
Ponderosa pine	5-30	1-30	100	100	Climax
Sugar pine	0-30	1-30	82	100	Climax
Incense cedar	0-10	0-10	64	73	Seral
Prince's pine		0-20		82	Decreaser
Wheeler's bluegrass		5-10		100	Increaser
White hawkweed		0-10		82	Increaser
Long-stolon sedge		0-10		73	Increaser

Ground Vegetation: White fir regeneration is the dominant tree species followed by ponderosa pine, sugar pine, and incense cedar . A number of shrubs may occur within this community. Major dominants include manzanita on the drier disturbed sites, while Oregon grape, creeping snowberry, and prince's pine are usually found in stands that are fairly well stabilized. Hawkweed, heartleaf arnica, Wheeler's bluegrass, needlegrass, and long-stolon sedge collectively cover 10-50 percent of the ground.

Indicators: Presence of sugar pine and incense cedar regeneration always place sites into this community. Presence of manzanita indicates past disturbance and potential brush problem. Long-stolon sedge may be very aggressive on the upper limits of this community.

Silviculture: Moderately high productivity. Lowest ponderosa pine site productivity for all associated communities, but good site for white fir, sugar pine, and incense cedar. Shelterwood recommended on south slopes to minimize incense cedar regeneration. In most stands, advanced white fir regeneration very heavy and ponderosa pine advanced regeneration somewhat light. Stands offer great opportunity for management. Two or three tree species may be favored on a given site in this community. White fir best cultured on upper elevational limits of community. Ponderosa pine best cultured on drier downslope position. Old growth sugar pine has high degree of shake but growth potential is very good. Stockability (monotype) for ponderosa pine is 70-138 sq. ft. BA/acre, 195-287 sq. ft. BA/acre for white fir and 43-237 sq. ft. BA/acre for sugar pine.

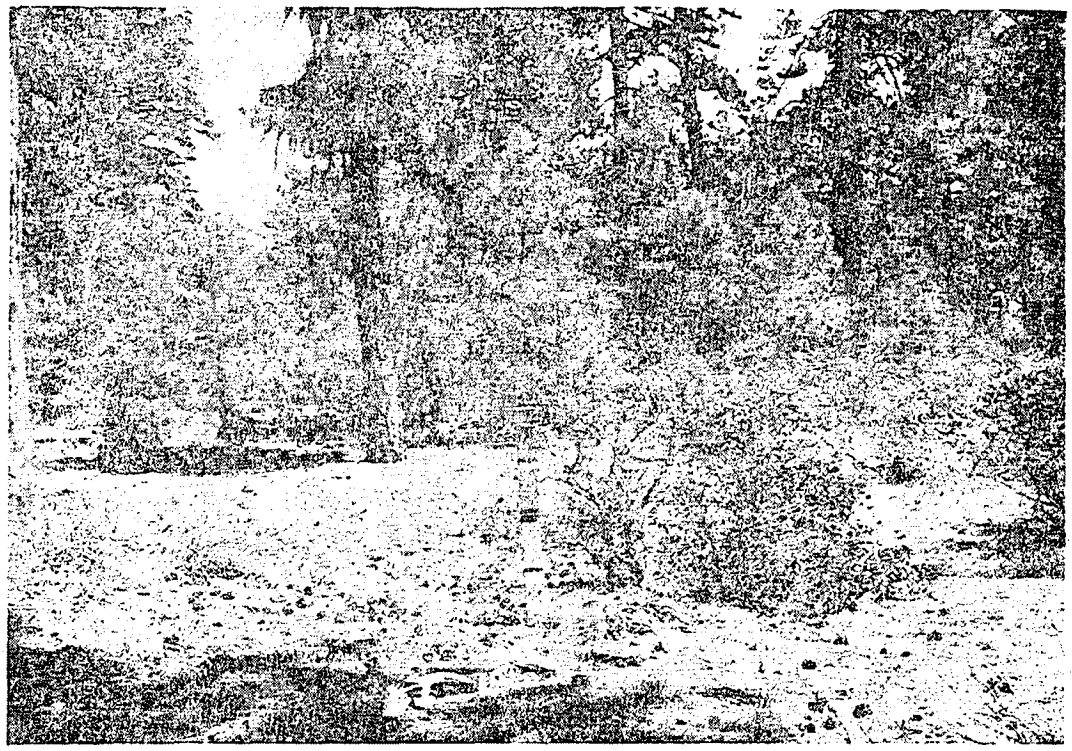
Revegetation: Revegetation not a problem on slopes less than 30 percent. Site preparation may be necessary in some places where microsite extremes are apparent. Perennial grass mix of orchardgrass and hard fescue suggested.

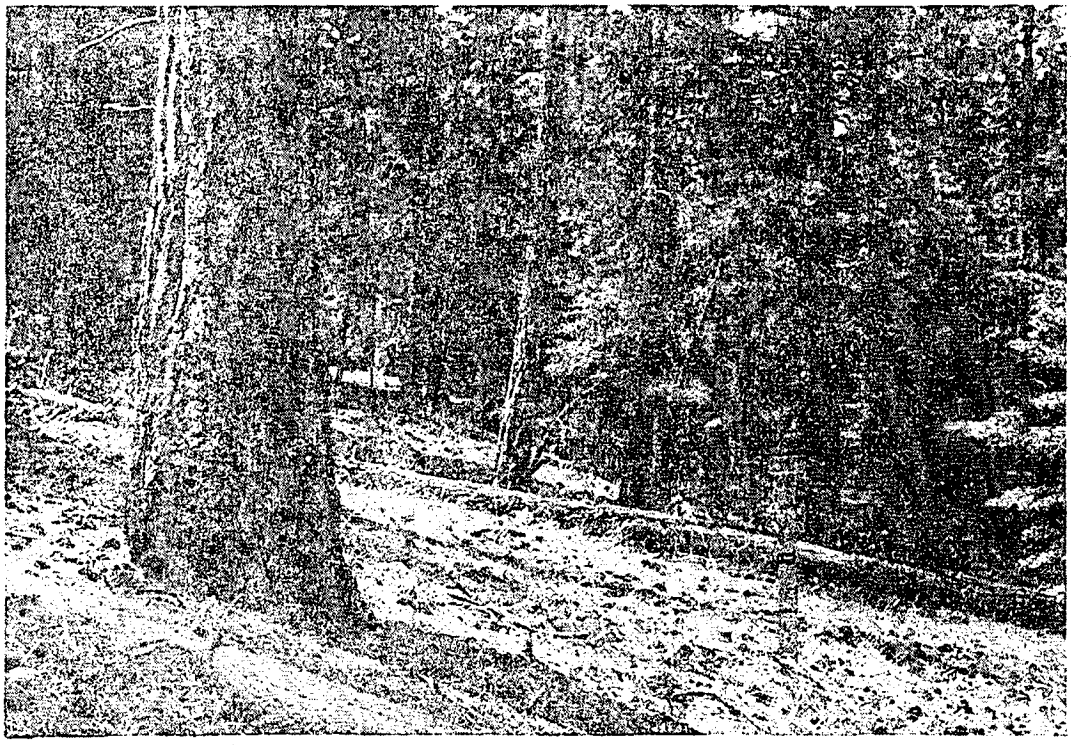
Problems Associated with Management: Highly defective mature white fir and sugar pine; incense cedar regeneration may become a site occupancy problem on drier outslopes. Manzanita may occupy site if heavy cut has opened canopy. Difficult scheduling problem when culturing two to three different tree species per acre.

PRODUCTIVITY: (11 plots)

	Site Index				TBA				GBA				Ft³/Yr Index			
	(PP)	(WF)	(SP)	(IC)	(PP)	(WF)	(SP)	(IC)	(PP)	(WF)	(SP)	(IC)	(PP)	(WF)	(SP)	(IC)
Mean	79	94	77	76	51	90	27	10	104	241	140	160	45	126	73	66
5% CI	4	13	8	*	15	26	15	9	34	46	97	*	15	33	52	*

WHITE FIR PONDEROSA PINE-INCENSE CEDAR/SERVICEBERRY CW-C1-11





WHITE FIR-PONDEROSA PINE-INCENSE CEDAR/SERVICEBERRY CW-C1-11

ENVIRONMENT

Location: West of Highway 395
Elevation: 5100-6000 ft.
Aspect: All aspects
Percent Slope: 5-55
Slope Position: Mid to upper one-third
Topography: Sideslopes to flats

SOILS

Geology: Tuff, breccia, basalt, and rhyolites
Grass Rooting Depth: 21 in.
Tree/Shrub Rooting Depth: 27 in.
Percent Stone: 10-60
Texture: Loams
Special: Well-drained soils on south-tending aspects

VEGETATION

Dominants	% Cover OS	% Cover US	Constancy OS	Constancy US	Status
Ponderosa pine	2-50	10-30	100	100	Climax
White fir	0-30	5-50	73	100	Climax
Incense cedar	0-10	2-10	62	100	Climax
Squawcarpet		0-30		65	Increaser
Serviceberry		0-30		88	Increaser
Oregon grape		0-10		77	Increaser
Wheeler's bluegrass		0-10		73	Increaser

Ground Vegetation: Diverse community in all three major lifeforms: tree; shrub: and herbaceous plants. White fir and ponderosa pine regeneration clearly dominates the stand. Incense cedar regeneration normally present. Squawcarpet, serviceberry, and Oregon grape dominate brush species and exhibit, collectively, 20 percent of the ground cover. Snowbrush distribution is erratic and may be found on sites where stands were recently disturbed. Heartleaf arnica and Wheeler's bluegrass are the most important herbaceous plants but a large number of species may be found on any given site.

Indicators: Presence of serviceberry indicates a good ponderosa site. Heartleaf arnica indicates white fir climax. Wheeler's bluegrass cover (greater than 5 percent) indicates either overgrazing or site disturbance and moderate to difficult regeneration problems.

Silviculture: Good commercial site for white fir and ponderosa pine; moderately high productivity. Shelterwood recommended in areas where incense cedar regeneration abundant. Thinning of white fir recommended in order to encourage ponderosa pine. Culturing of both white fir and ponderosa pine on the same site suggested. Abundant advanced natural regeneration of ponderosa pine, white fir, and incense cedar found on most sites. Site preparation may be required in areas where heavy shrub cover exists. Stockability for ponderosa pine is 110-146 sq. ft. BA/acre; white fir is 233-297 sq. ft. BA/acre.

Revegetation: Perennial seed mix of orchardgrass, smooth brome, hard fescue, intermediate wheatgrass, and timothy suggested.

Problems Associated with Management: Heavy selection of ponderosa pine in the past and increased cover of white fir regeneration has greatly impacted future crops of ponderosa pine. Heavy white fir and incense cedar regeneration does not favor ponderosa pine regeneration. Mature white fir and incense cedar highly defective. South slopes favor incense cedar and squawcarpet.

PRODUCTIVITY (26 plots)

	Site Index (PP)	Site Index (WF)	TBA (PP)	TBA (WF)	TBA (IC)	GBA (PP)	GBA (WF)	Ft³/Yr Index (PP)	Ft³/Yr Index (WF)
Mean	80	82	92	66	17	128	265	57	114
5% CI	3	5	15	23	8	18	32	16	23

WHITE FIR-PONDEROSA PINE-WESTERN WHITE PINE/STICKY CURRANT
CW-C4-11

WHITE FIR-PONDEROSA PINE-WESTERN WHITE PINE/STICKY CURRANT CW-C4-11

ENVIRONMENT

Location: Warner Mountains
Elevation: 6500-7400 ft.
Aspect: Northerly
Slope Percent: 10-30
Slope Position: Mid to upper one-third
Topography: Sideslopes or convex flats

SOILS

Geology: Rhyolite, basalt
Grass Rooting Depth: 25 in.
Tree/Shrub Rooting Depth: 32 in.
Percent Stone: 10-80
Texture: Loams
Special: Rocky surface soils

VEGETATION

Dominants	% Cover		Constancy		Status
	OS	US	OS	US	
Ponderosa pine	0-30	0-15	82	45	Climax
White fir	10-50	5-30	100	100	Climax
Western white pine	2-50	2-10	100	100	Climax
Sticky currant		0-10		82	Increaser
White hawkweed		0-5		82	Increaser
Wheeler's bluegrass		1-10		100	Increaser
Long-stolon sedge		0-5		91	Increaser

Ground Vegetation: Ponderosa pine regeneration either absent or never occupying more than 15 percent ground cover while white fir and western white pine regeneration collectively occupy 30-40 percent of the area. Sticky currant is the most common shrub although it may be totally absent on a given site. Shrub diversity is very low. White hawkweed, Wheeler's bluegrass, heartleaf arnica, whitevein pyrola, tuber starwort, and long-stolon sedge comprise the most important herbaceous cover. Amount of ground cover is greatly reduced toward the upper elevational limits of the community.

Indicators: Western white pine indicates past conflagration and high elevation. Lack of shrub and herbaceous diversity implies a short growing season, undeveloped soils, heavy snow loads, and probable regeneration difficulty.

Silviculture: High site productivity for ponderosa pine, western white pine, and white fir. Ponderosa pine best cultured on lower slope positions with white fir and western white pine best cultured on mid slope to upper limits of community range. Shelterwood recommended due to potentially severe microsite modification associated with logging. Lodgepole pine regeneration can be expected on flats or benches. Stockability for ponderosa pine is 124-268 sq. ft. BA/acre, 165-287 sq. ft. BA/acre for white fir, and 123-289 sq. ft. BA/acre for western white pine.

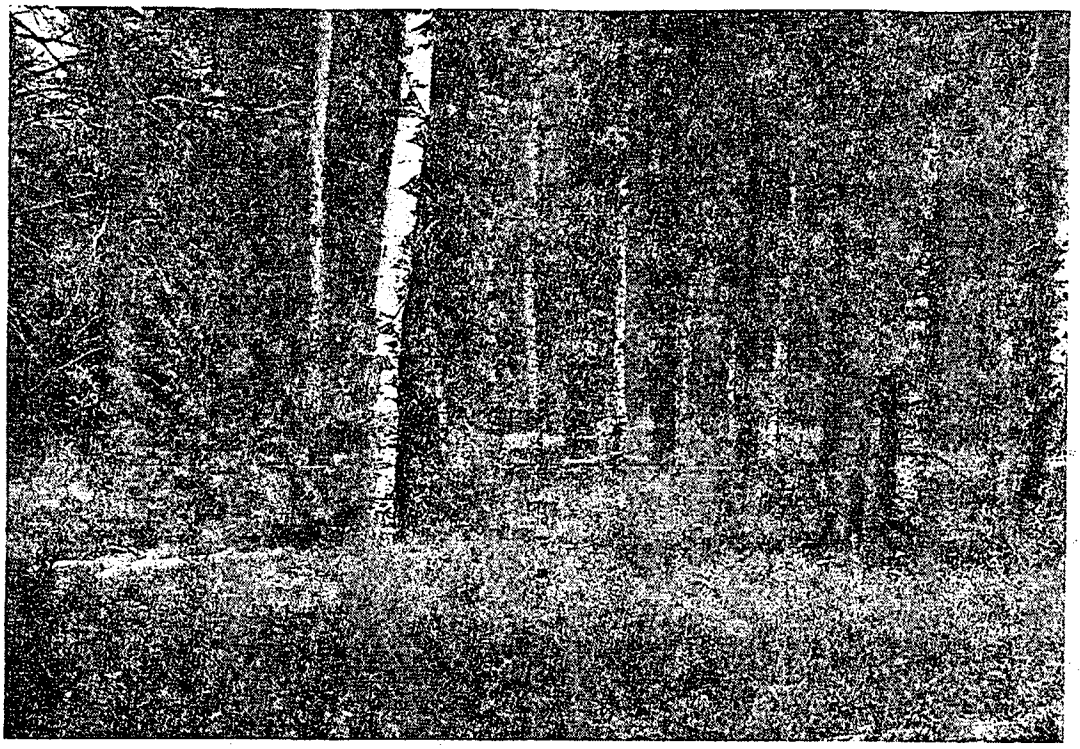
Revegetation: Perennial seed mix of mountain brome, hard fescue, and orchardgrass recommended. On steeper sites where soil retention is critical an annual wheat or rye is suggested.

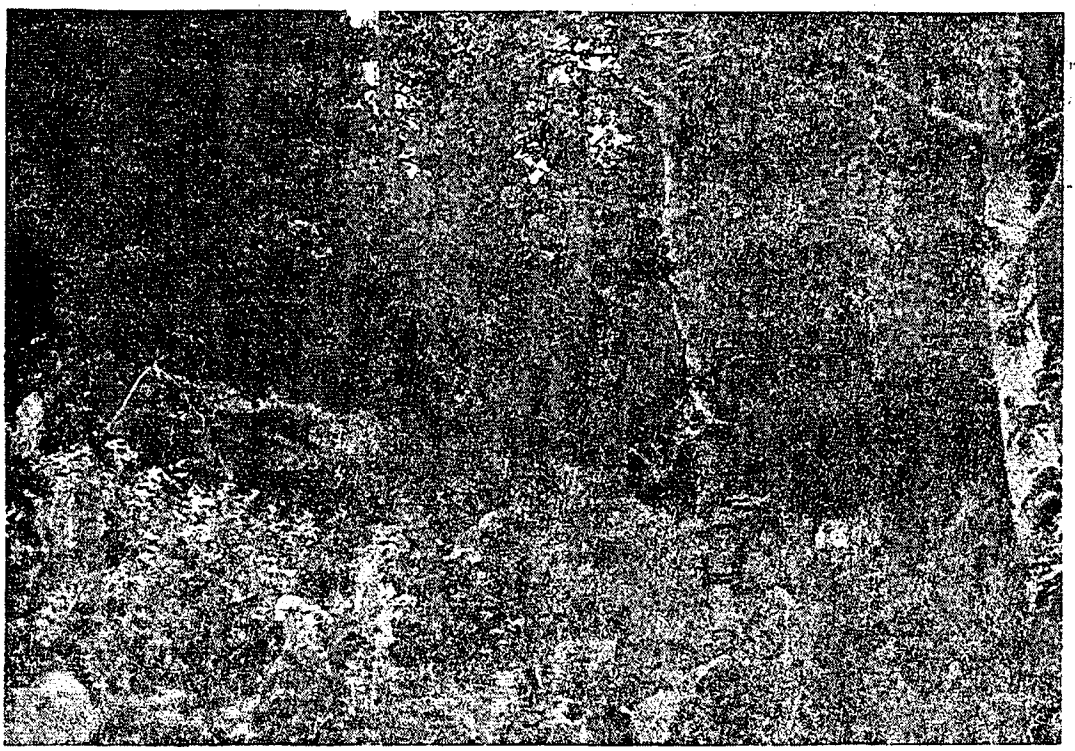
Problems Associated with Management: Mature western white pine have heartrot and often are infected with blister rust. White fir also highly defective. Intensive management is a problem due to limited soil depth and short growing season. Dwarfmistletoe present in ponderosa pine.

PRODUCTIVITY (11 plots)

	Site Index			TBA			GBA			Ft^3/Yr Index		
	(WF)	(PP)	(WWP)	(WF)	(PP)	(WWP)	(WF)	(PP)	(WWP)	(WF)	(PP)	(WWP)
Mean	80	71	73	143	34	48	226	196	206	101	78	95
5% CI	6	8	11	20	17	19	61	72	83	29	33	32

WHITE FIR-PONDEROSA PINE-QUAKING ASPEN/LONG-STOLON SEDGE
CW-H2-11





WHITE FIR-PONDEROSA PINE-QUAKING ASPEN/LONG-STOLON SEDGE CW-H2-11

ENVIRONMENT

Location: All of Fremont
Elevation: 5800-7000 ft.
Aspect: All aspects
Percent Slope: 6-26
Slope Position: Bottom to top of slope
Topography: Bottoms, flats, terraces or concave sideslopes

SOILS

Geology: Ash over basalts, colluvium
Grass Rooting Depth: 20 in.
Tree/Shrub Rooting Depth: 28 in.
Percent Stone: 10-40
Texture: Silty-clayey loams
Special: Seasonal saturation, water table normally near soil surface

VEGETATION

Dominants	% Cover OS	% Cover US	Constancy OS	Constancy US	Status
Ponderosa pine	30-50	5-30	100	100	Climax
White fir	5-10	5-50	100	100	Climax
Quaking aspen	0-30	5-30	40	100	Climax
Wheeler's bluegrass		5-40		100	Increaser
Yarrow		1-30		100	Increaser
Long-stolon sedge		1-30		100	Increaser

Ground Vegetation: Ponderosa pine and white fir regeneration slightly more abundant than quaking aspen regeneration. All three tree species always present, collectively, at 30-70 percent cover. Shrub cover normally very sparse and low in diversity. Wheeler's bluegrass, yarrow, bottlebrush squirreltail, long-stolon sedge, sweetanise, and vetch constitute the major herbaceous cover.

Indicators: Usually somewhat lush ground vegetation with quaking aspen on the wetter soils. Sweetanise usually indicates a good ponderosa pine site and only fair white fir site. Young quaking aspen occur in clones and are usually interconnected by roots.

Silviculture: Good commercial site for ponderosa pine; high productivity. Care must be used in any cultural treatment within this community due to potential visual impact. Soils often wet-moist and any logging activity would churn the soils greatly. Only salvage and sanitation cuts are recommended. Stockability for ponderosa pine is 85-187 sq. ft. BA/acre.

Revegetation: Abundant native vegetation present. Perennial grass mix of intermediate wheatgrass, orchardgrass, white clover and tall fescue recommended.

Problems Associated with Management: Wet soils dictate highly seasonal logging operation; soils easily eroded. Community important to wildlife and domestic livestock.

PRODUCTIVITY (5 plots)

	Site Index (PP)	TBA (WF)	TBA (PP)	TBA (LP)	TBA (QA)	GBA (PP)	Ft^3/Yr Index (PP)
Mean	78	122	21	25	10	136	59
5% CI	22	55	18	*	*	51	31

* Data too variable to compute a confidence interval.

SPECIES LIST — LINE DRAWINGS

This species list is a composite of the major plant species found on both the Winema and Fremont National Forests. Also included are some of the important pathogens, insects, lichens, and mammals. The following lists are alphabetized first by common name and then by scientific name. The line drawings are alphabetized by scientific name and grouped by lifeform. The lifeform groups are presented in colored sections:

Trees ..... Blue
Shrubs ..... Green
Grasses & Sedges..... Pink
Forbs ..... Yellow

Each species illustrated is accompanied by a general statement of its indicator value on the Winema or Fremont National Forest, and when known a note as to this species economic or medicinal use. The source for most of the line drawings was:

Hitchcock, C. Leo, A. Cronquist, M. Ownbey, and J.W. Thompson. 1969.
Vascular plants of the Pacific Northwest. Part 1:
Vascular cryptograms, gymnosperms, and monocotyledons.
Univ. Wash. Press, Seattle. 914p.

Hitchcock, C. Leo, A. Cronquist, M. Ownbey, and J.W. Thompson. 1964.
Vascular plants of the Pacific Northwest. Part 2:
Salicaceae to Saxifragaceae. Univ. Wash. Press, Seattle. 597p.

Hitchcock, C. Leo, A. Cronquist, M. Ownbey, and J.W. Thompson. 1961.
Vascular plants of the Pacific Northwest. Part 3:
Saxifragaceae to Ericaceae. Univ. Wash. Press, Seattle. 614p.

Hitchcock, C. Leo, A. Cronquist, M. Ownbey, and J.W. Thompson. 1959.
Vascular plants of the Pacific Northwest. Part 4:
Ericaceae to Campanulaceae. Univ. Wash. Press, Seattle. 510p.

Hitchcock, C. Leo, A. Cronquist, M. Ownbey, and J.W. Thompson. 1955.
Vascular plants of the Pacific Northwest. Part 5: Compositae.
Univ. Wash. Press, Seattle. 343p.

Portions of the note sections were extracted from:

Angier, B. 1978. Field guide to medicinal wild plants.
Stackpole Books, Harrisburg, PA 320p.

Benoliel, D. 1974. Northwest Foraging. Signpost Pub., Lynnwood, WA. 173p.

Strickler, G.S. Personal communication. PNW Range and Wildlife Habitat Lab.,
La Grande, OR

USDA Forest Service. 1937. Range Plant Handbook. USDA, Wash. D.C.

SPECIES LIST

Common Name	Scientific Name	
TREES		
Bitter cherry	*Prunus*	*emarginata*
Douglas-fir	*Pseudotsuga*	*menziesii*
Engelmann spruce	*Picea*	*engelmannii*
Incense cedar	*Calocedrus*	*decurrens*
Lodgepole pine	*Pinus*	*contorta*
Mountain hemlock	*Tsuga*	*mertensiana*
Ponderosa pine	*Pinus*	*ponderosa*
Quaking aspen	*Populus*	*tremuloides*
Shasta red fir	*Abies*	*magnifica shastensis*
Subalpine fir	*Abies*	*lasiocarpa*
Sugar pine	*Pinus*	*lambertiana*
Western juniper	*Juniperus*	*occidentalis*
Western white pine	*Pinus*	*monticola*
White fir	*Abies*	*concolor*
Whitebark pine	*Pinus*	*albicaulis*
SHRUBS		
Antelope bitterbrush	*Purshia*	*tridentata*
Basin big sagebrush	*Artemisia*	*tridentata tridentata*
Bearberry	*Arctostaphylos*	*uva-ursi*
Big huckleberry	*Vaccinium*	*membranaceum*
Boxwood	*Pachistima*	*myrsinites*
Common snowberry	*Symphoricarpos*	*albus*
Creeping oregon grape	*Berberis*	*repens*
Creeping snowberry	*Symphoricarpos*	*mollis*
Curlleaf mountain-mahogany	*Cercocarpus*	*ledifolius*
Dwarf huckleberry	*Vaccinium*	*caespitosum*
Golden chinquapin	*Castanopsis*	*chrysophylla*
Granite gilia	*Leptodactylon*	*pungens*
Gray rabbitbrush	*Chrysothamnus*	*nauseosus*
Green rabbitbrush	*Chrysothamnus*	*viscidiflorus*
Greenleaf manzanita	*Arctostaphylos*	*patula*
Grouse huckleberry	*Vaccinium*	*scoparium*
Low sagebrush	*Artemisia*	*arbuscula*
Mountain big sagebrush	*Artemisia*	*tridentata vaseyana*
Narrowleaf goldenweed	*Haplopappus*	*stenophyllus*
Oregongrape	*Berberis*	*aquifolium*
Pinemat manzanita	*Arctostaphylos*	*nevadensis*
Prince's pine	*Chimaphila*	*umbellata*
Rabbitbrush goldenweed	*Haplopappus*	*bloomeri*
Red huckleberry	*Vaccinium*	*parvifolium*
Rose spirea	*Spiraea*	*douglasii roseata*
Saskatoon serviceberry	*Amelanchier*	*alnifolia*
Silver sagebrush	*Artemisia*	*cana*
Snowbrush ceanothus	*Ceanothus*	*velutinus*
Squawcarpet ceanothus	*Ceanothus*	*prostratus*
Subalpine big sagebrush	*Artemisia*	*tridentata spiciformis*
Subalpine spirea	*Spiraea*	*densiflora*
Trailing blackberry	*Rubus*	*ursinus macropetalus*
Wax currant	*Ribes*	*cereum*
SEDGES AND RUSHES		
Baltic rush	*Juncus*	*balticus*
Beaked sedge	*Carex*	*rostrata*
Bigleaf sedge	*Carex*	*amplifolia*
Long-stolon sedge	*Carex*	*pensylvanica*
Nebraska sedge	*Carex*	*nebraskensis*
Ross' sedge	*Carex*	*rossii*
Smallwing sedge	*Carex*	*microptera*
Water sedge	*Carex*	*aquatilis*

Common Name	Scientific Name	
GRASSES		
Alpine timothy	*Phleum*	*alpinum*
Bluebunch wheatgrass	*Agropyron*	*spicatum*
Bottlebrush squirreltail	*Sitanion*	*hystrix*
California oatgrass	*Danthonia*	*californica*
Cheatgrass brome	*Bromus*	*tectorum*
Fairway crested wheatgrass	*Agropyron*	*cristatum*
Giant wildrye	*Elymus*	*cinereus*
Idaho fescue	*Festuca*	*idahoensis*
Intermediate wheatgrass	*Agropyron*	*intermedium*
Kentucky bluegrass	*Poa*	*pratensis*
Mountain brome	*Bromus*	*marginatus*
Nevada bluegrass	*Poa*	*nevadensis*
Northern meadow barley	*Hordeum*	*brachyantherum*
Onespike oatgrass	*Danthonia*	*unispicata*
Orchardgrass	*Dactylis*	*glomerata*
Prairie junegrass	*Koeleria*	*cristata*
Pubescent wheatgrass	*Agropyron*	*trichophorum*
Pullup muhly	*Muhlenbergia*	*filiformis*
Red fescue	*Festuca*	*rubra*
Redtop	*Agrostis*	*alba*
Reed canarygrass	*Phalaris*	*arundinacea*
Reed fescue	*Festuca*	*arundinacea*
Russian wildrye	*Elymus*	*junceus*
Sandberg bluegrass	*Poa*	*sandbergii*
Slender wheatgrass	*Agropyron*	*caninum*
Smooth brome	*Bromus*	*inermis*
Thurber needlegrass	*Stipa*	*thurberiana*
Timothy	*Phleum*	*pratense*
Tufted hairgrass	*Deschampsia*	*caespitosa*
Western needlegrass	*Stipa*	*occidentalis*
Wheat	*Triticum*	*aestivum*
Wheeler's bluegrass	*Poa*	*nervosa*
Winter rye	*Secale*	*cereale*
FORBS		
American bistort	*Polygonum*	*bistortoides*
American vetch	*Vicia*	*americana*
Arrowhead balsamroot	*Balsamorhiza*	*sagittata*
Aster	*Aster*	*spp.*
Ballhead sandwort	*Arenaria*	*congesta*
Balloonpod milkvetch	*Astragalus*	*whitneyi*
Bedstraw	*Galium*	*oreganum*
Biscuitroot	*Lomatium*	*spp.*
Bleedinghearts	*Dicentra*	*formosa*
Broadleaf strawberry	*Fragaria*	*virginiana platypetala*
California falsehellebore	*Veratrum*	*californicum*
Clarkia	*Clarkia*	*rhomboidea*
Common dandelion	*Taraxacum*	*officinale*
Davidson penstemon	*Penstemon*	*davidsonii*
Fern-leaf biscuitroot	*Lomatium*	*dissectum*
Fireweed	*Epilobium*	*angustifolium*
Foxglove	*Digitalis*	*purpurea*
Gay penstemon	*Penstemon*	*laetus*
Gland cinquefoil	*Potentilla*	*glandulosa*
Hairy hawkweed	*Hieracium*	*albiflorum*
Heartleaf arnica	*Arnica*	*cordifolia*
Holboell rockcress	*Arabis*	*holboellii*
King's sandwort	*Arenaria*	*kingii*
Knotweed	*Polygonum*	*spp.*
Knotweed	*Polygonum*	*nudum*
Linanthastrum	*Linanthastrum*	*nuttallii*
Longstalk clover	*Trifolium*	*longipes*
Moss phlox	*Phlox*	*musciodes*
Mountain sweetroot	*Osmorhiza*	*chilensis*

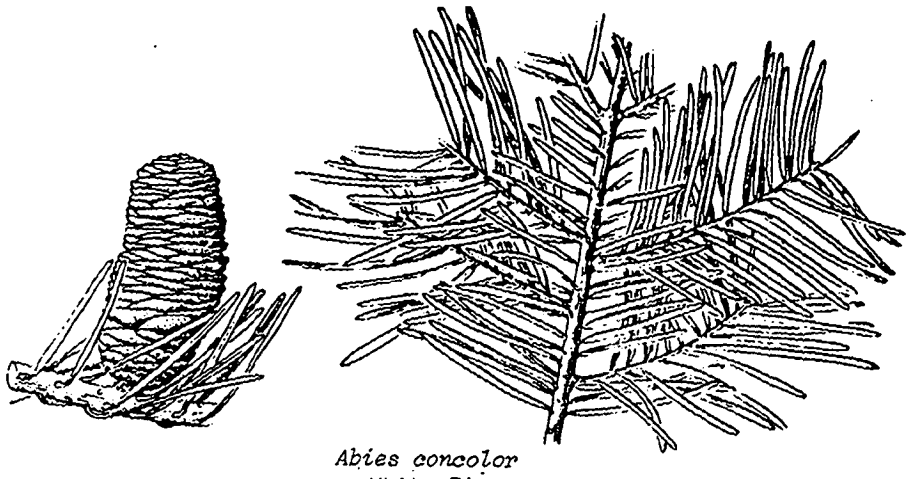
Common Name	Scientific Name	
Nineleaf lomatium	*Lomatium*	*triternatum*
Phacelia	*Phacelia*	*hastata*
Pine lupine	*Lupinus*	*albicaulis*
Pinewoods pussytoes	*Antennaria*	*geyeri*
Primrose monkey flower	*Mimulus*	*primuloides*
Pussytoes	*Antennaria*	*ssp.*
Sidebells pyrola	*Pyrola*	*secunda*
Silvery lupine	*Lupinus*	*argenteus*
Slender cinquefoil	*Potentilla*	*gracilis glabrata*
Speedwell	*Veronica*	*peregrina*
Spreading phlox	*Phlox*	*diffusa*
Starry solomonplume	*Smilacina*	*stellata*
Tailcup lupine	*Lupinus*	*caudatus*
Tawny horkelia	*Horkelia*	*fusca capitata*
Tuber starwort	*Stellaria*	*jamesiana*
Twinflower	*Linnaea*	*borealis*
Western rattlesnake plantain	*Goodyera*	*oblongifolia*
Western yarrow	*Achillea*	*millefolium lanulosa*
Whitevein pyrola	*Pyrola*	*picta*
Wiry knotweed	*Polygonum*	*majus*
Wooly wyethia	*Wyethia*	*mollis*
PATHOGENS		
Dwarfmistletoe (Douglas-fir)	*Arceuthobium*	*douglasii*
Dwarfmistletoe (lodgepole pine)	*Arceuthobium*	*americanum*
Dwarfmistletoe (ponderosa pine)	*Arceuthobium*	*campylopodum f. campylopodum*
Dwarfmistletoe (white fir)	*Arceuthobium*	*campylopodum f. abietinum*
Elytroderma needlecast (lodgepole pine. ponderosa pine)	*Elytroderma*	*deformans*
Fomes annosus (all species)	*Fomes*	*annosus*
Indian paint fungus (mountain hemlock)	Echinodontium	tinctorium
Laminated root rot (all species)	*Phellinus*	*weirii*
Root rot (all species)	*Armillaria*	*mellea*
Stalactiform rust (lodgepole pine)	*Cronartium*	*stalactiforme*
Western gall rust (lodgepole pine) (Ponderosa pine)	*Peridermium*	*harkenessii*
INSECTS		
Fir engraver (true firs)	*Scolytus*	*ventralis*
Western shoot borer	*Eucosma*	*sonamana*
MAMMALS		
Mazama pocket gopher	*Thomomys*	*mazama*
Mule deer	*Odocoileus*	*hemionus hemionus*
Northern pocket gopher	*Thomomys*	*talpoides*
Pronghorn antelope	*Antilocarpra*	*americana*
LICHENS		
Common yellow staghorn	Letharia	*vulpina*
Green and black oldman's beard	*Usnea*	*ssp.*

SPECIES LIST

Scientific Name		Alpha Code	Common Name
TREES			
Abies	*concolor*	ABCO	White fir
Abies	*lasiocarpa*	ABLA2	Subalpine fir
Abies	*magnifica shastensis*	ABMAS	Shasta red fir
Calocedrus	*decurrens*	CADE	Incense cedar
Juniperus	*occidentalis*	JUOC	Western juniper
Picea	*engelmannii*	PIEN	Engelmann spruce
Pinus	*albicaulis*	PIAL	Whitebark pine
Pinus	*contorta*	PICO	Lodgepole pine
Pinus	*lambertiana*	PILA	Sugar pine
Pinus	*monticola*	PIMO	Western white pine
Pinus	*ponderosa*	PIPO	Ponderosa pine
Populus	*tremuloides*	POTR	Quaking Aspen
Prunus	*emarginata*	PREM	Bitter cherry
Pseudotsuga	*menziesii*	PSME	Douglas-fir
Tsuga	*mertensiana*	TSME	Mountain hemlock
SHRUBS			
Amelanchier	*alnifolia*	AMAL	Saskatoon serviceberry
Arctostaphylos	*nevadensis*	ARNE	Pinemat manzanita
Arctostaphylos	*patula*	ARPA	Greenleaf manzanita
Arctostaphylos	*uva-ursi*	ARUV	Bearberry
Artemisia	*arbuscula*	ARAR	Low sagebrush
Artemisia	*cana*	ARCA	Silver sagebrush
Artemisia	*tridentata tridentata*	ARTRT	Basin big sagebrush
Artemisia	*tridentata spiciformis*	ARTRS	Subalpine big sagebrush
Artemisia	*tridentata vaseyana*	ARTRV	Mountain big sagebrush
Berberis	*aquifolium*	BEAQ	Oregon grape
Berberis	*repens*	BERE	Creeping oregon grape
Castanopsis	*chrysophylla*	CACH	Golden chinquapin
Ceanothus	*prostratus*	CEPR	Squawcarpet ceanothus
Ceanothus	*velutinus*	CEVE	Snowbrush ceanothus
Cercocarpus	*ledifolius*	CELE	Curlleaf mountain-mahogany
Chimaphila	*umbellata*	CHUM	Prince's pine
Chrysothamnus	*nauseosus*	CHNA	Gray rabbitbrush
Chrysothamnus	*viscidiflorus*	CHVI	Green rabbitbrush
Haplopappus	*bloomeri*	HABL	Rabbitbrush goldenweed
Haplopappus	*stenophyllus*	HAST	Narrowleaf goldenweed
Leptodactylon	*pungens*	LEPU2	Granite gilia
Pachistima	*myrsinites*	PAMY	Boxwood
Purshia	*tridentata*	PUTR	Antelope bitterbrush
Ribes	*cereum*	RICE	Wax currant
Rubus	*ursinus macropetalus*	RUURM	Trailing blackberry
Spiraea	*densiflora*	SPDE	Subalpine spirea
Spiraea	*douglasii roseata*	SPDOR	Rose spirea
Symphoricarpos	*albus*	SYAL	Common snowberry
Symphoricarpos	*mollis*	SYMO	Creeping snowberry
Vaccinium	*caespitosum*	VACA	Dwarf blueberry
Vaccinium	*membranaceum*	VAME	Big huckleberry
Vaccinium	*parvifolium*	VAPA	Red huckleberry
Vaccinium	*scoparium*	VASC	Grouse huckleberry
SEDGES AND RUSHES			
Carex	*amplifolia*	CAAM	Bigleaf sedge
Carex	*aquatilis*	CAAQ	Water sedge
Carex	*microptera*	CAMI	Smallwing sedge
Carex	*nebraskensis*	CANE	Nebraska sedge
Carex	*pensylvanica*	CAPE5	Long-stolon sedge
Carex	*rossii*	CARO	Ross' sedge
Carex	*rostrata*	CARO2	Beaked sedge
Juncus	*balticus*	JUBA	Baltic rush

Scientific Name		Alpha Code	Common Name
GRASSES			
Agropyron	*cristatum*	AGCR	Fairway crested wheatgrass
Agropyron	*intermedium*	AGIN2	Intermediate wheatgrass
Agropyron	*spicatum*	AGSP	Bluebunch wheatgrass
Agropyron	*caninum*	AGCA	Slender wheatgrass
Agropyron	*trichophorum*	AGTR2	Pubescent wheatgrass
Agrostis	*alba*	AGAL	Redtop
Bromus	*inermis*	BRIN	Smooth brome
Bromus	*marginatus*	BRMA	Mountain brome
Bromus	*tectorum*	BRTE	Cheatgrass brome
Dactylis	*glomerata*	DAGL	Orchardgrass
Danthonia	*californica*	DACA	California oatgrass
Danthonia	*unispicata*	DAUN	Onespike oatgrass
Deschampsia	*caespitosa*	DECA	Tufted hairgrass
Elymus	*cinereus*	ELCI	Giant wildrye
Elymus	*junceus*	ELJU	Russian wildrye
Festuca	*arundinacea*	FEAR3	Reed fescue
Festuca	*idahoensis*	FEID	Idaho fescue
Festuca	*rubra*	FERU	Red fescue
Hordeum	*brachyantherum*	HOBR	Northern meadow barley
Koeleria	*cristata*	KOCR	Prairie junegrass
Muhlenbergia	*filiformis*	MUFI	Pullup muhly
Phalaris	*arundinacea*	PHAR	Reed canarygrass
Phleum	*alpinum*	PHAL	Alpine timothy
Phleum	*pratense*	PHPR	Timothy
Poa	*leibergii*	POLE2	Leiberg bluegrass
Poa	*nervosa*	PONE	Wheeler's bluegrass
Poa	*nevadensis*	PONE2	Nevada bluegrass
Poa	*pratensis*	POPR	Kentucky bluegrass
Poa	*sandbergii*	POSA3	Sandberg bluegrass
Secale	*cereale*	SECE	Winter rye
Sitanion	*hystrix*	SIHY	Bottlebrush squirreltail
Stipa	*occidentalis*	STOC	Western needlegrass
Stipa	*thurberiana*	STTH	Thurber needlegrass
Triticum	*aestivum*	TRAE	Wheat
FORBS			
Achillea	*millefolium lanulosa*	ACMIL	Western yarrow
Antennaria	*spp.*	ANTE	Pussytoes
Antennaria	*geyeri*	ANGE2	Pinewoods pussytoes
Arabis	*holboellii*	ARHO	Holboell rockcress
Arenaria	*congesta*	ARCO2	Ballhead sandwort
Arenaria	*kingii*	ARKI	King's sandwort
Arnica	*cordifolia*	ARCO	Heartleaf arnica
Aster	*spp.*	ASTER	Aster
Astragalus	*whitneyi*	ASWH	Balloonpod milkvetch
Balsamorhiza	*sagittata*	BASA	Arrowhead balsamroot
Clarkia	*rhomboidea*	CLRH	Clarkia
Dicentra	*formosa*	DIFO	Bleedinghearts
Digitalis	*purpurea*	DIPU	Foxglove
Epilobium	*angustifolium*	EPAN	Fireweed
Fragaria	*virginiana platypetala*	FRVIP	Broadleaf strawberry
Galium	*oreganum*	GAOR	Bedstraw
Goodyera	*oblongifolia*	GOOB	Western rattlesnake plantian
Hieracium	*albiflorum*	HIAL	Hairy hawkweed
Horkelia	*fusca capitata*	HOFUC	Tawny horkelia
Linanthastrum	*nuttallii*	LINU	Linanthrastrum
Linnaea	*borealis*	LIBO2	Twinflower
Lomatium	*spp.*	LOMA	Biscuitroot
Lomatium	*dissectum*	LODI2	Fern-leaf biscuitroot
Lomatium	*triternatum*	LOTR	Nineleaf lomatium
Lupinus	*albicaulis*	LUAL	Pine lupine
Lupinus	*argenteus*	LUAR3	Silvery lupine
Lupinus	*caudatus*	LUCA	Tailcup lupine
Mimulus	*primuloides*	MIPR	Primrose monkey flower
Osmorhiza	*chilensis*	OSCH	Mountain sweetroot

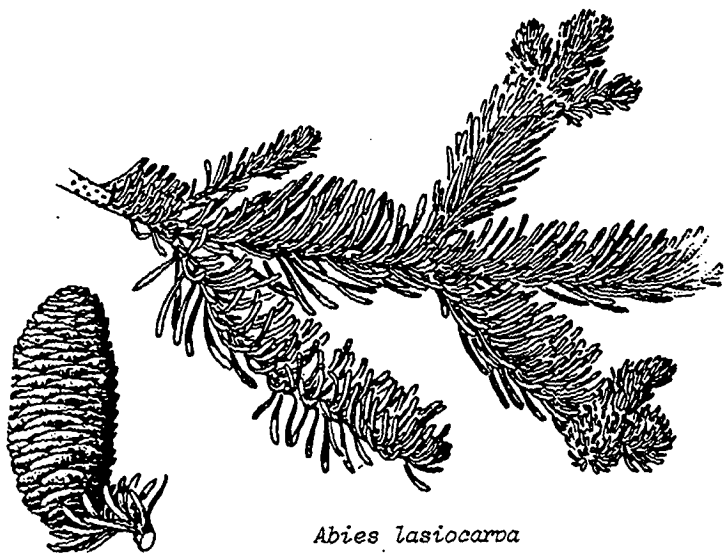
Scientific Name		Alpha Code	Common Name
Penstemon	*davidsonii*	PEDA	Davidson penstemon
Penstemon	*laetus*	PELA	Gay penstemon
Phacelia	*hastata*	PHHA	Phacelia
Phlox	*diffusa*	PHDI	Spreading phlox
Phlox	*musciodes*	PHMU2	Moss phlox
Polygonum	*spp.*	POLYG	Knotweed
Polygonum	*bistortoides*	POBI	American bistort
Polygonum	*majus*	POMA2	Wiry knotweed
Polygonum	*nudum*	PONU	Knotweed
Potentilla	*glandulosa*	POGL	Gland cinquefoil
Potentilla	*gracilis glabrata*	POGRG	Slender cinquefoil
Pyrola	*picta*	PYPI	Whitevein pyrola
Pyrola	*secunda*	PYSE	Sidebells pyrola
Smilacina	*stellata*	SMST	Starry solomonplume
Stellaria	*jamesiana*	STJA	Tuber starwort
Taraxacum	*officinale*	TAOF	Common dandelion
Trifolium	*longipes*	TRLO	Longstalk clover
Veratrum	*californicum*	VECA	California falsehellebore
Veronica	*peregrina*	VEPE	Speedwell
Vicia	*americana*	VIAM	American vetch
Wyethia	*mollis*	WYMO	Wooly wyethia
PATHOGENS			
Arceuthobium	*americanum*		Dwarfmistletoe (lodgepole pine)
Arceuthobium	*campylopodum f. abietinum*		Dwarfmistletoe (white fir)
Arceuthobium	*campylopodum f. campylopodum*		Dwarfmistletoe (ponderosa pine)
Arceuthobium	*douglasii*		Dwarfmistletoe (Douglas-fir)
Armillaria	*mellea*		Root rot (all species)
Cronartium	*stalactiforme*		Stalactiform rust (lodgepole pine)
Elytroderma	*deformans*		Elytroderma needlecast lodgepole pine. ponderosa pine)
Echinodontium	*tinctorium*		Indian paint fungus (mountain hemlock)
Fomes	*annosus*		Fomes annosus (all species)
Peridermium	*harkenessii*		Western gall rust (lodgepole pine. ponderosa pine)
Phellinus	*weirii*		Laminated root rot (all species)
INSECTS			
Eucosma	*sonomana*		Western shoot borer
Scolytus	*ventralis*		Fir engraver (true firs)
MAMMALS			
Antilocapra	*americana*		Pronghorn antelope
Odocoileus	*hemionus hemionus*		Mule deer
Thomomys	*mazama*		Mazama pocket gopher
Thomomys	*talpoides*		Northern pocket gopher
LICHENS			
Letharia	*vulpina*		Common yellow staghorn
Usnea	*spp.*		Green and black oldman's beard



Abies concolor
White Fir

Indic: All elevations except high Cascades and timberline on Fremont NF; best growth on deep, rich, moist soils and cool, moist environments; found readily associating with all tree species except Shasta red fir, mountain hemlock, and whitebark pine.

Note: Indians boiled needles for tea.

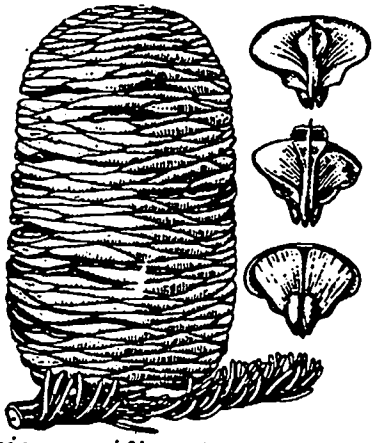


Abies lasiocarpa

Subalpine Fir

Indic: Alpine to sub-alpine conditions; cold, moist climate; moderate to poor forest site; moderate to severe regeneration problems.

Note: Gummy exudate on bark soaked in water till soft may be used as antiseptic. Also burned needles for incense and prepared as tea for colds (Blackfoot Indians).

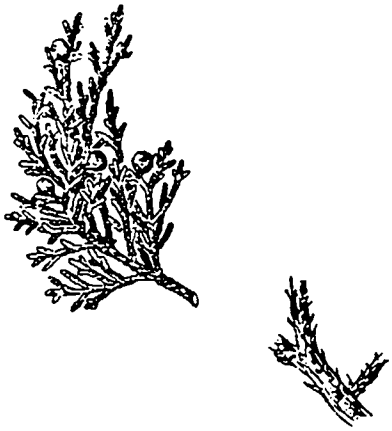


Abies magnifica shastensis

Abies magnifica shastensis

Shasta Red Fir

Indic: High mountain slopes and ridges to lower protected gentle mountain slopes in and around meadows, to steep exposed windswept ridges near high divides, and crests. Also in cool sheltered ravines, gulches and high rolling mountain plateaus. Best on moist, porous, sandy or gravelly loam soils, but also on very rocky poor sites with shallow soils. At upper limit with mountain hemlock, lodgepole pine and western white pine. Restocks high slopes and openings cleared by fire, storm or pathogens.

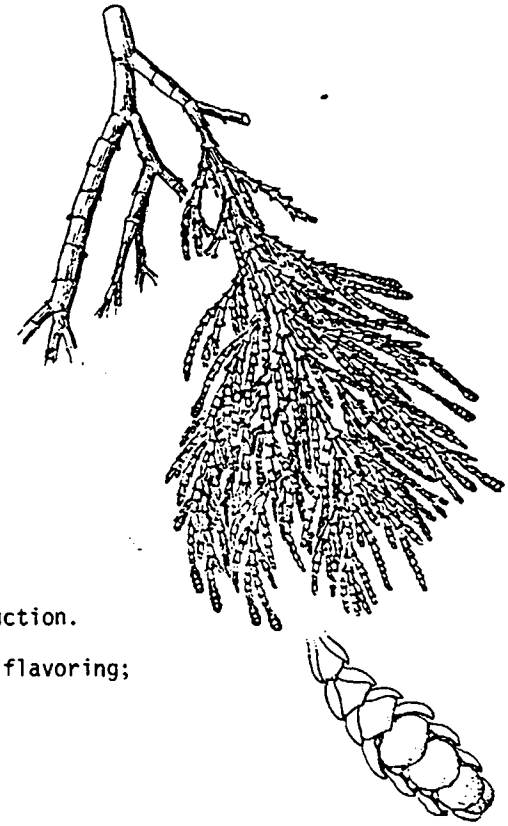


Juniperus occidentalis

Western Juniper

Indic: Shallow, stony soil, low wood or forage production.

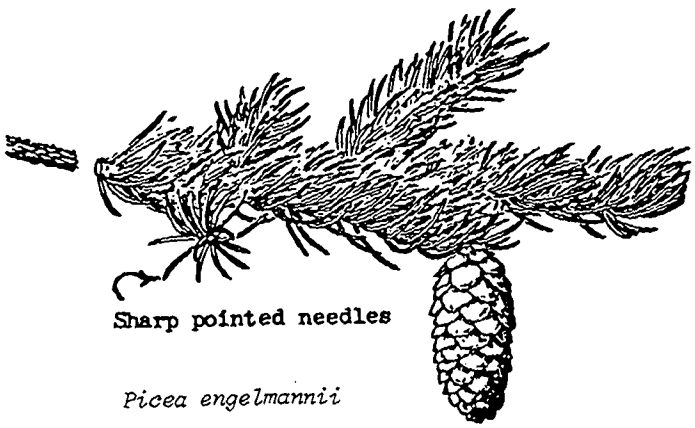
Note: Berries edible raw, best when dried, used as flavoring; moderate palatability for birds in winter.



Calocedrus decurrens

Incense Cedar

Indic: Common on west and dry south slopes; best on porous soil with abundant moisture. Occurs as pure patches of advanced regeneration or may be evenly spaced in stand. Found with ponderosa pine, Douglas-fir, white fir and sugar pine. Sensitive to fires and somewhat "weedy" in nature; successional.

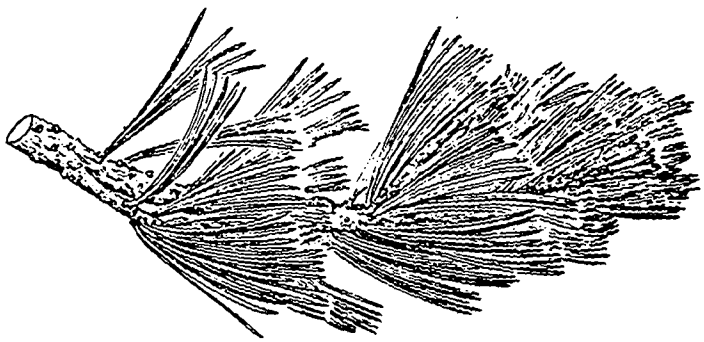


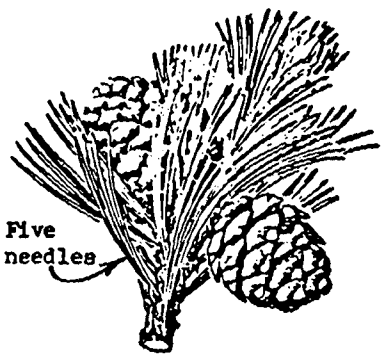
Picea engelmannii

Picea engelmannii

Engelmann Spruce

Indic: Upper forest association, moderate to poor forest site, moderate to severe regeneration problems, frost heaving of bare soil.

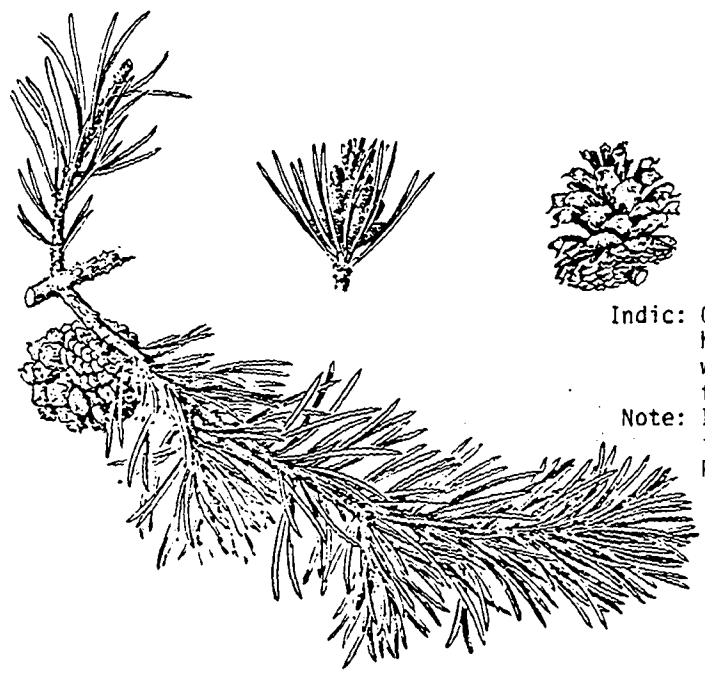




Pinus albicaulis

Whitebark Pine

Indic: Alpine conditions; cold, moist climate; non-commercial forest.

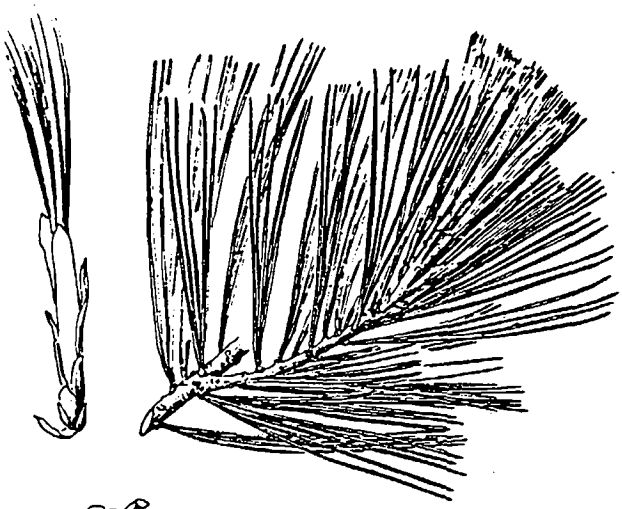


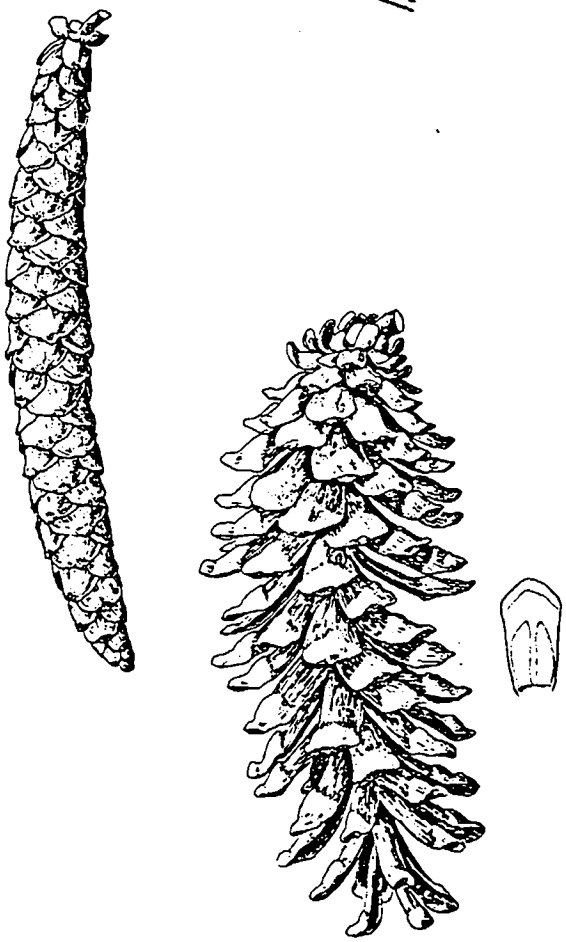
Lodgepole Pine

Indic: Generally climax on mid-slope to high elevation sites. Often found with both ponderosa pine and white fir; fir tends to be climax.

Note: Indians chewed buds for sore throat; inner bark (cambium) mashed and eaten. Pitch is placed on sores.

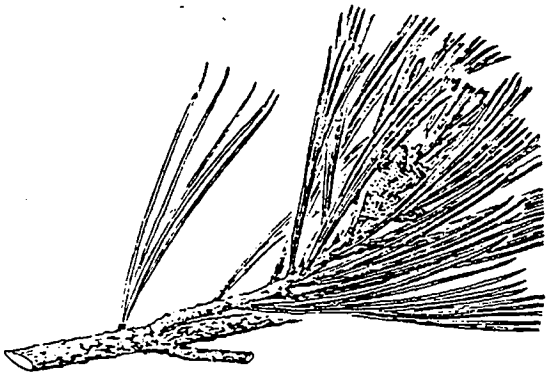
Pinus contorta

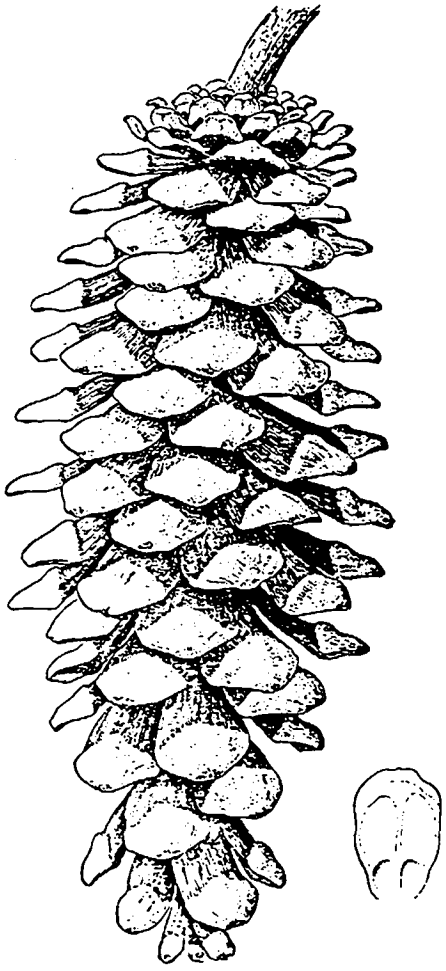




Pinus monticola
Western White Pine

Indic: Past conflagration; good forest site; successional to white fir; severe blister rust problem

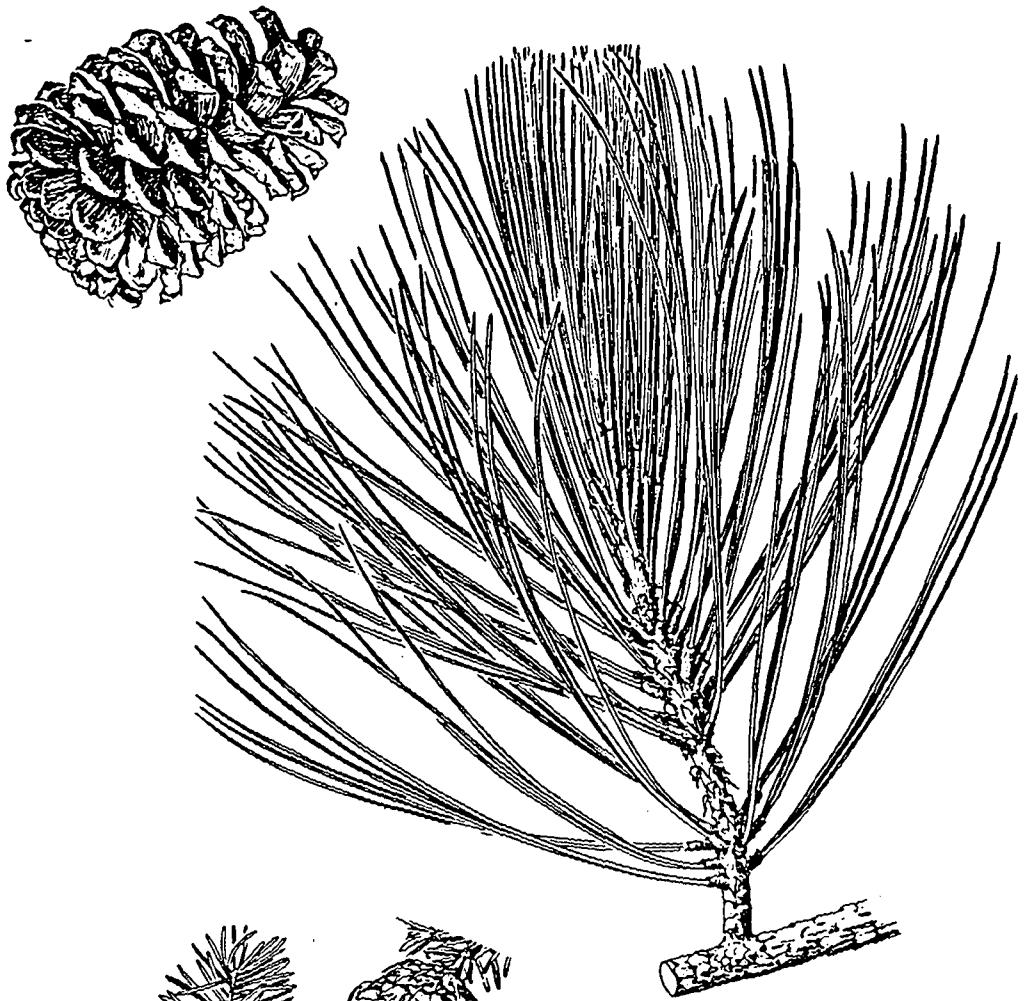




Pinus lambertiana

Sugar Pine

Indic: Mostly on north slopes and benches, in ravines and canyons grows on glacial drift and volcanic ash to deep loose sands and clays; rich, well drained, sandy loam or gravelly soils most characteristic. Never in pure stands; associated with white fir, Douglas-fir and ponderosa pine. Prefers cool, moist sites.

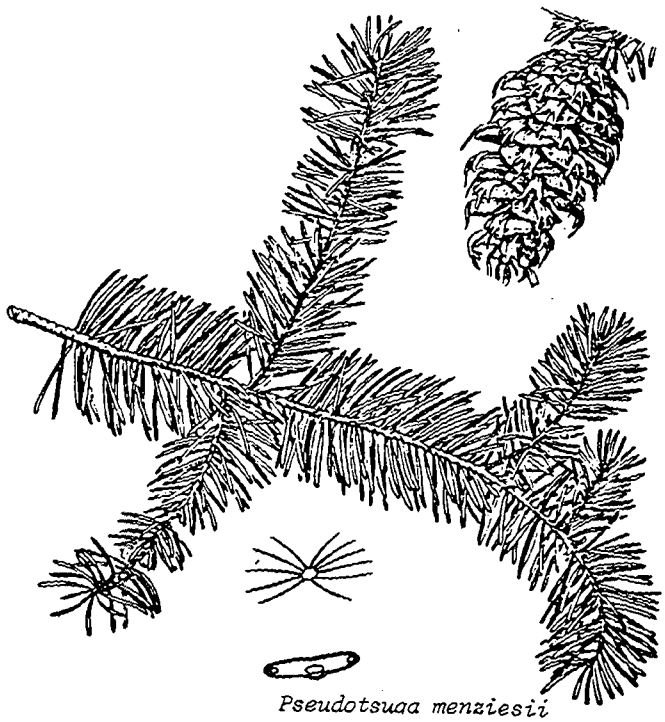


Pinus ponderosa

Ponderosa Pine

Indic: May be climax or successional on a given site; savanna to forest.

Note: Local severe damage from porcupine; tree often used for winter den tree. Indians pealed bark and used cambium for medicinal purposes.



Pseudotsuga menziesii

Douglas-Fir

Indic: Good forest site, many management opportunities.

Note: Fresh, current growth needles steeped to make tea. Moderate palatability for game; buds used by blue grouse.

Tsuga mertensiana

Mountain Hemlock

Indic: Thrives in most well-drained soils, not too dry; best in loose, coarse, moist soils. Best on flats, gentle slopes, moist valleys, or in sheltered ravines. Prefers northern exposures. Endures severe habitats.

Populus tremuloides

Quaking Aspen

Indic: Dry to wet meadow; occurs as clones by root sprouts which gradually enlarge the clump under light to moderate grazing; decreases under heavy grazing; palatable.

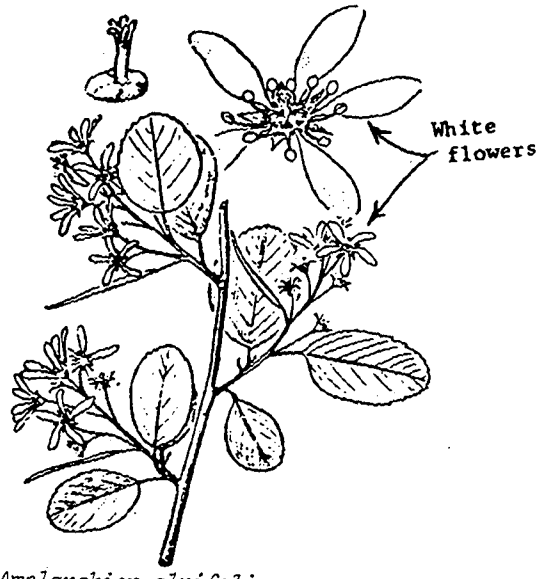
Note: Cree indians used cambium for food and used an infusion of cambium as a remedy for coughs.

Prunus emarginata

Bitter Cherry

Indic: Near streams on low and high mountain slopes and on moist benches. High elevations-dryish to moist gravelly soils; lower elevations-rich, sandy or gravelly soils. Found with white fir and Shasta red fir at high elevations; found with Douglas-fir, ponderosa pine, and ponderosa pine and white fir at lower elevations.

Note: Indians boiled bark to make a laxative; also used as a contraceptive.



Amelanchier alnifolia
Saskatoon Serviceberry

Indic: Good ponderosa pine sites; generally climax white fir forest.
Note: Berries edible raw, cooked, dried, and made into wine. Indians dried berries and pounded them with meat in 10-15 lbs. pemmican loaves for storage and use in cooking. Highly palatable to game and livestock.

Arctostaphylos nevadensis
Pinemat Manzanita

Indic: Upper elevation and upper forest environments (cool to cold and moist); generally moderate to severe clearcut regeneration problems.
Note: Berries edible raw, cooked, made into wine.

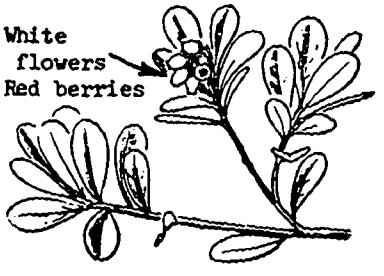
Arctostaphylos patula

Greenleaf manzanita

Indic: Forms dense and extensive brush fields on old burns in pure ponderosa pine and mixed conifer types. On dry slopes and old burns. Found with mountain-mahogany and snowbrush; will improve site.
Note: Leaves grazed by goats; bears will eat berries.

Arctostaphylos patula

Leaves not sharp pointed



Arctostaphylos uva-ursi
Bearberry

Indic: Moderate to good pine and fir sites; wide distribution and tends to increase with overgrazing. Trailing shrub to about 6" tall.
Note: Berries edible raw but are better cooked;made into wine; leaves make pleasant smoke and also a source of tannin.

Artemisia cana

Silver Sagebrush

Indic: Mountains and higher valleys on more moist sites than *A. tridentata*; invades into meadow types where overgrazed and water table lowered.

Artemisia tridentata

Big Sagebrush

Artemisia arbuscula

Low Sagebrush

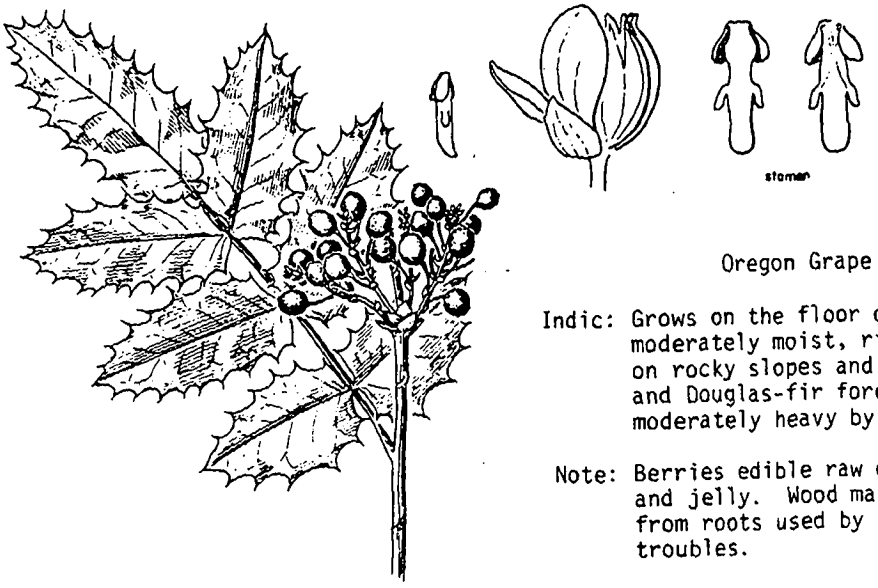
Indic: Shallow, non-forest soils(8-24"); often has some gravel and large boulders on surface. Looks like fair to poor range condition big sagebrush.

Note: Moderate palatability.

Indic: Without Trees: Good site for grass and shrub production; wheatgrass and/or fescue dominant in good range condition; deep, well-drained soils.

With Trees: Savanna conditions in ponderosa pine; shallow to deep soils; non-commercial forest site; extreme regeneration problems.

Note: Moderate to low palatability. Three varieties recognized: *A. tridentata tridentata* (basin big sagebrush) is a tall shrub mainly in non-forested areas; *A. tridentata vaseyana* (mountain big sagebrush) is widespread in the forest zone ; and *A. tridentata spiciformis* (subalpine big sagebrush) is found at high elevations with true firs and at the upper limit of ponderosa pine. Indians used plants for covering their huts and used the bark for making ropes and baskets.

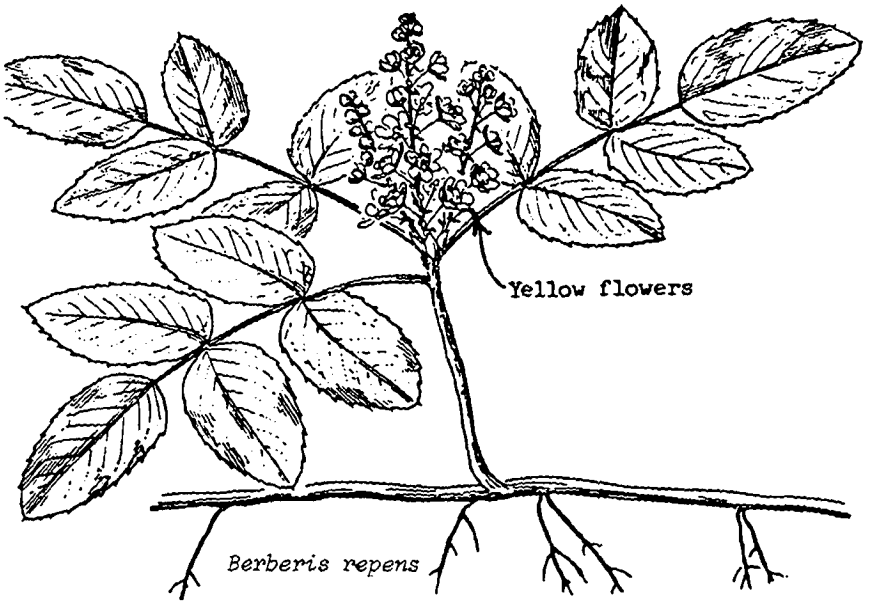


Berberis aquifolium

Oregon Grape

Indic: Grows on the floor of coniferous forests in moderately moist, rich, humus soils; common on rocky slopes and occurs under white fir and Douglas-fir forests. Grazed lightly to moderately heavy by deer and elk.

Note: Berries edible raw or cooked; used in wine and jelly. Wood makes yellow dye. Bark from roots used by indians to cure stomach troubles.



Creeping Oregon Grape

Indic: Only moderate to fair forest sites, generally with ponderosa pine; gravelly to stony soils; moderate regeneration problems. Tends to increase with overgrazing.

Note: Blue berries edible raw, cooked, used in wine; yellow dye from roots.

Castanopsis chrysophylla
Golden Chinquapin

Indic: Evergreen shrub or small tree, dry open sites to fairly thick woodlands. Mid mountain elevations.

Use: Large enough in some areas to harvest; increases with disturbance.

Ceanothus prostratus
Squawcarpet Ceanothus

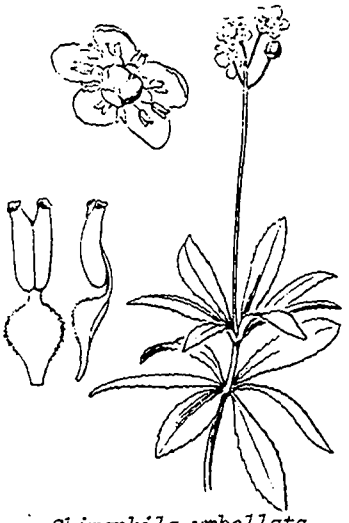
Indic: In Ponderosa Pine or mixed conifer forests mostly does best on well-drained soils. Sheep sometimes graze on blossoms, fruit and new growth. Deer graze buds and new year growth.

Use: Seed used as food, leaves used as tobacco and for tea. Bark and roots make an astringent and tonic.

Ceanothus velutinus
Snowbrush Ceanothus

Indic: Past fire, amount and vigor suggest time since fire (young, abundant plants indicate recent fire); seed requires heat for germination; widespread; moderate site; ponderosa pine successional to white fir climax.

Note: Bark and roots make an astringent and tonic.



Chimaphila umbellata

Chimaphila umbellata
Prince's pine

Indic: Good forest sites, in the best fir sites; generally easy regeneration; widespread. Generally less than ½ foot tall.

Use: Roots and leaves boiled for drink; leaves used in medicine as astringent; plant an ingredient in root beer.

Cercocarpus ledifolius
Curlleaf mountain-mahogany

Indic: Without Trees:
Unique sites of stony soil or borders along forest.
With Trees:
Moderately poor forest site, often low fertility soil; difficult regeneration.

Cercocarpus ledifolius

Chrysothamnus viscidiflorus

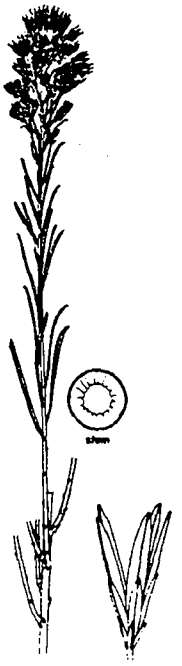
Chrysothamnus viscidiflorus
Green Rabbitbrush

Indic: Occasional plants occur in most big sage communities; dominance means past fire, or severe soil disturbance.

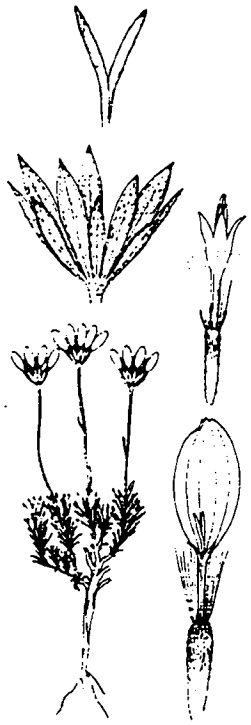
Chrysothamnus nauseosus
Gray Rabbitbrush

Indic: Occasionally occur in most big sage communities; dominance means past fire, or severe soil disturbance.

Use: Plant used for experimental rubber production 1942-1944.



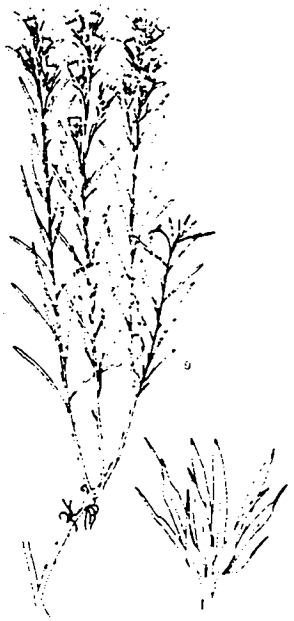
Chrysothamnus nauseosus



Haplopappus stenophyllus

Narrowleaf Goldenweed

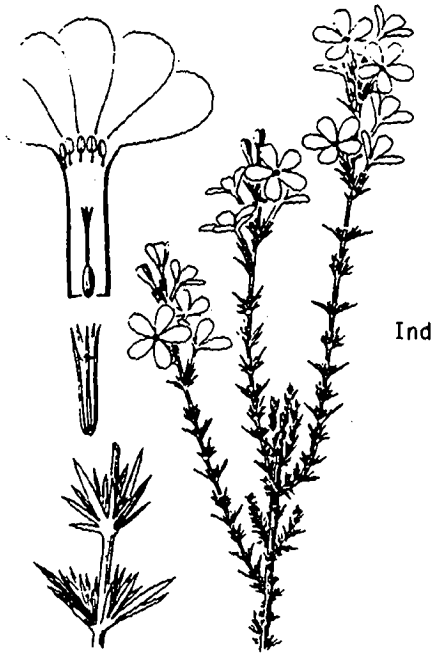
Indic: Creeping plants 4-6" in height on very shallow (6-8") soil;scablands associated with sandberg bluegrass; very harsh sites.



Haplopappus bloomeri

Rabbitbrush Goldenweed

Indic: Foothills to moderate elevation in mountains; dry, rocky slopes, and open woods.



Leptodactylon pungens

Leptodactylon pungens
Granite gilia

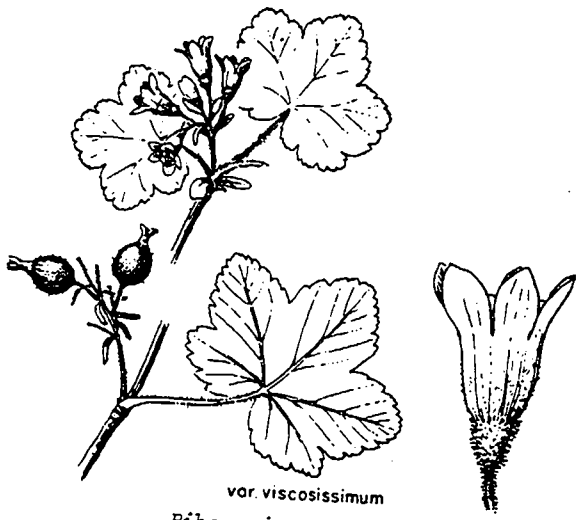
Indic: Sweetly aromatic shrub. Dry places from desert to high elevations in drier mountains in Eastern Cascades. Dry, open, often sandy or rocky places.

Pachistima myrsinites

Pachistima myrsinites
Boxwood

Indic: In white fir, douglas-fir and Engelmann spruce belts; fairly moist to moist sandy or moist gravelly loams on northern slopes. Highly palatable for game animals.

Note: Reputed to be a remedy for kidney and rheumatic disorders.



Ribes viscosissimum

Ribes viscosissimum
Sticky Currant

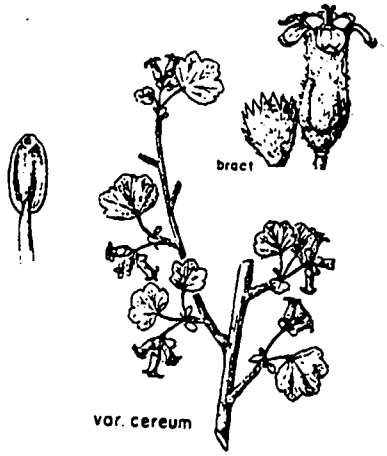
Indic: Common invader in White fir clearcuts, tends to replace big huckleberry in the cut community; may cause regeneration problems.

Note : Berries edible raw or cooked; Indians used berries in pemmican (cooked, shredded meat, pounded berries, cooked meat fat).

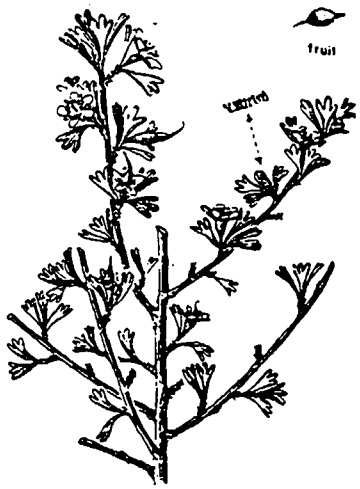
Ribes cereum
Wax Currant

Indic: Good ponderosa pine and white fir sites; increases in clearcuts; occurs where soil moisture is better and with past disturbance.

Note: Berries edible, used by Hopi indians for stomach problems; alternate host for white pine blister rust.



Ribes cereum



Purshia tridentata
Antelope bitterbrush

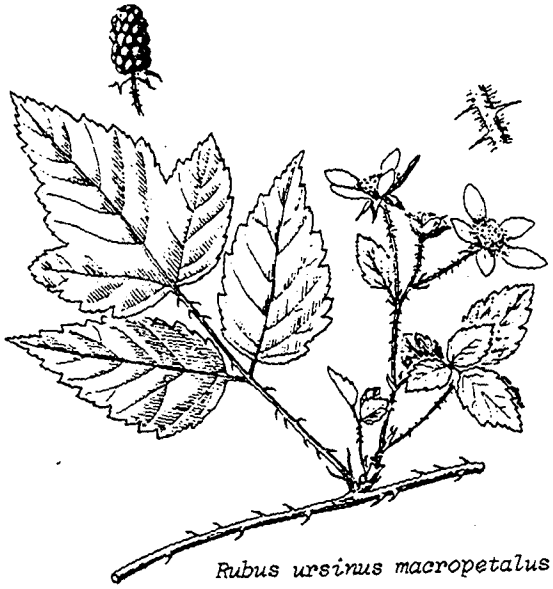
Indic: <u>Without trees</u>:

Good forage producing site for bunchgrass; often key big game winter range.

<u>With trees</u>:

A poor forest site, generally one productivity class lower than the same forest community without bitterbrush; often rather shallow, stony soil; difficult regeneration.
1 to 6 feet tall, often hedged into a round, compact shape.

Note : Highly palatable.

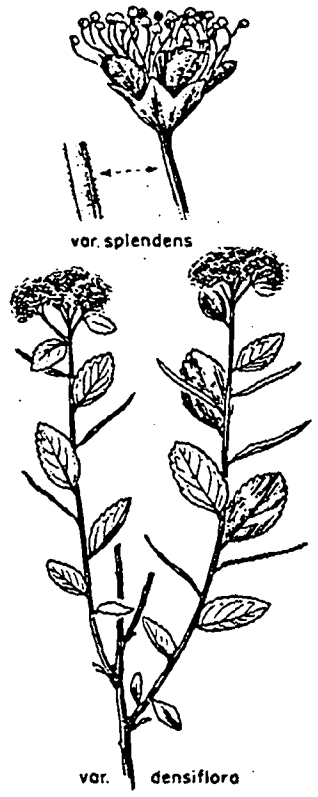


Rubus ursinus macropetalus

Trailing Blackberry

Indic: Grows most profusely in cut-over areas and old burns; also common in open woods.

Note: Palatable to sheep, fair to cattle. Elk and deer graze leaves and ripe berries. Berries also used by bears and some birds. Indians ate berries fresh and dried. Vine with leaves attached were boiled for tea to treat stomach problems.



Spiraea densiflora

Subalpine Spirea

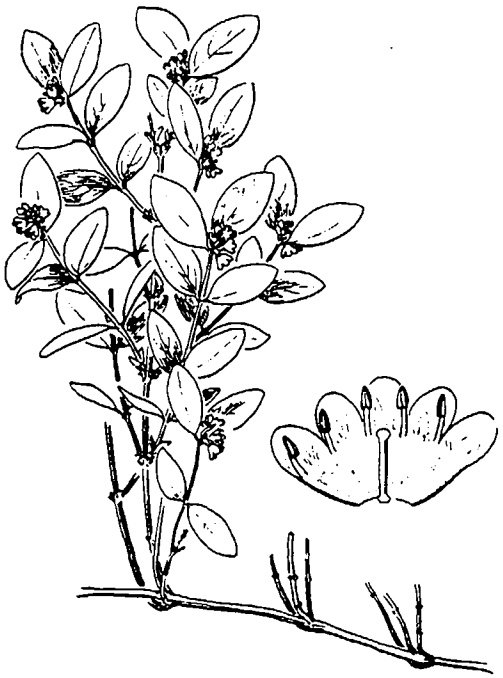
Indic: Grows as individual, low, many stemmed shrub. Grows on deep fertile moist soils. Found with western white pine and lodgepole pine; prefers rocky sites.

Spiraea douglasii

Spiraea douglasii

Rose Spirea

Indic: Deciduous shrub in wet meadows or in wet lodgepole pine communities.



Symphoricarpos mollis var. hesperius

Symphoricarpos mollis
Creeping snowberry

Indic: Along drainage lines and open areas, dry or moist soils.

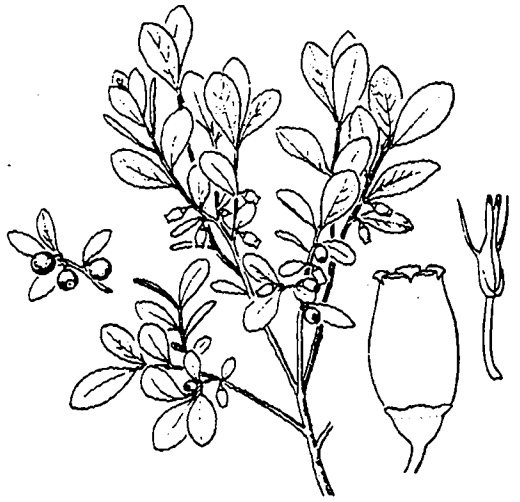
Use: Contains Saponin, a poisonous drug, in leaves (but not berries), however no loss or sickness has been reported.

Symphoricarpos albus
Common snowberry

Indic: A better forest site than the herbaceous vegetation suggest, one productivity class above the average; slow range trend; moderate regeneration.

Use: Leaves contain Saponin, a poisonous drug - no losses or sickness has been reported.

Symphoricarpos albus



Vaccinium caespitosum

Vaccinium caespitosum

Dwarf blueberry

Indic: Acid soils, with coniferous forests, common with Lodgepole, Ponderosa pine and Engelmann Spruce. Low palability, low spreading shrub 3 to 12 inches high.

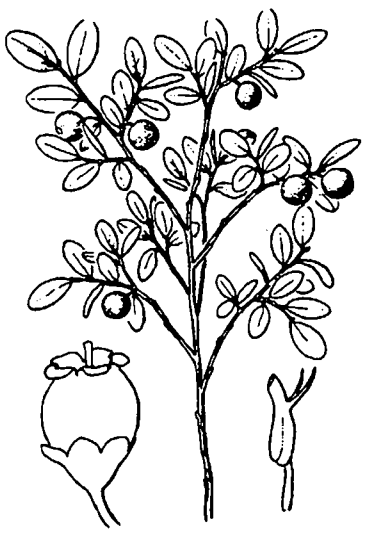
Vaccinium membranaceum

Big Huckleberry

Indic: Found at high elevation with stands of mountain hemlock-lodgepole pine. Plants never more than 20-30" in height; never abundant.

Note: Berries excellent raw, cooked, or made into a wine.

Vaccinium membranaceum



Vaccinium parvifolium

Vaccinium parvifolium
Red huckleberry

Indic: Moist coniferous woods - best in spruce type forests where duff and humus have accumulated. Leaves and twigs moderately grazed by sheep, occasionally by cattle, important game browse in some areas.

Note: Berries have a pleasant flavor; can be eaten raw or used in jellies or pies. Tea can be made from leaves; indians boiled bark for a tea to treat colds.

Vaccinium scoparium
Grouse huckleberry

Indic: Cold soils due to upper elevations or cold air drainage; fair to poor forest sites for fir, spruce and lodgepole pine; moderately severe to severe regeneration problems; frost heaving potential; poor to fair range seeding potential.

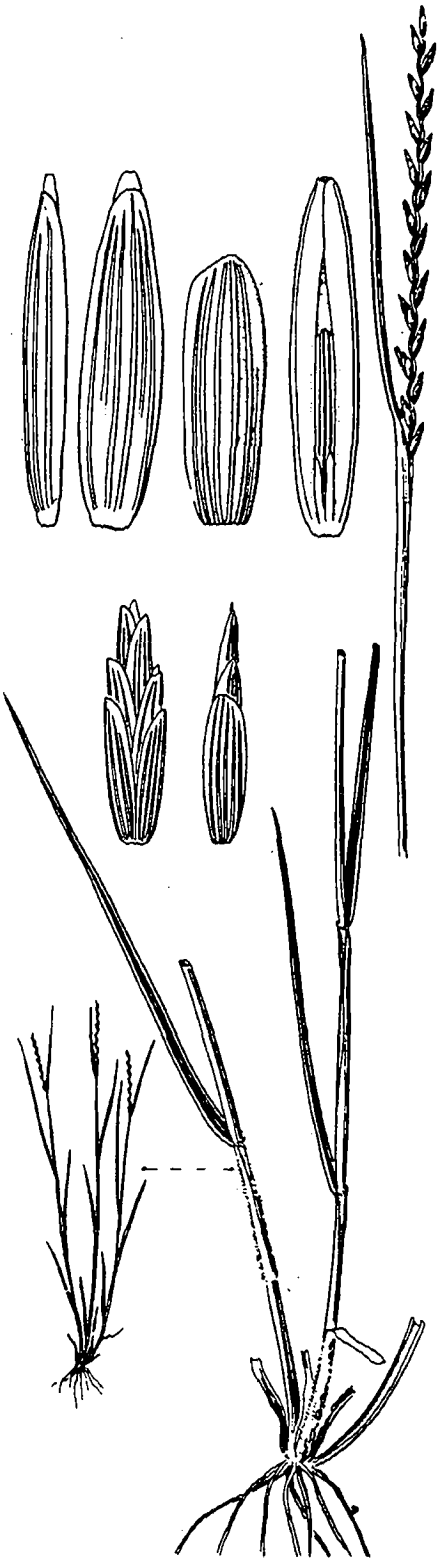
Note: Red berries edible raw, cooked, made into wine although they are so small as to be tedious to collect.

Vaccinium scoparium

Agropyron cristatum

Fairway Crested Wheatgrass

Indic: Domestic grass used for revegetation; grows on wide range of soils from sandy loam to heavy clay. Highly palatable to all classes of animals.



Agropyron intermedium

Intermediate Wheatgrass

Indic: Domestic grass used for revegetation;planted for pastures;well drained fertile soils with ample moisture. Good hay yield.

Agropyron spicatum

Bluebunch Wheatgrass

Indic: Moderate to deep sage and bunchgrass soils; fair to good productivity on most sites; decreases with overgrazing.
With Trees: Indicates ponderosa pine savanna (transition from brush to forest); non-commercial forest land; extreme regeneration problems.

Agropyron caninum

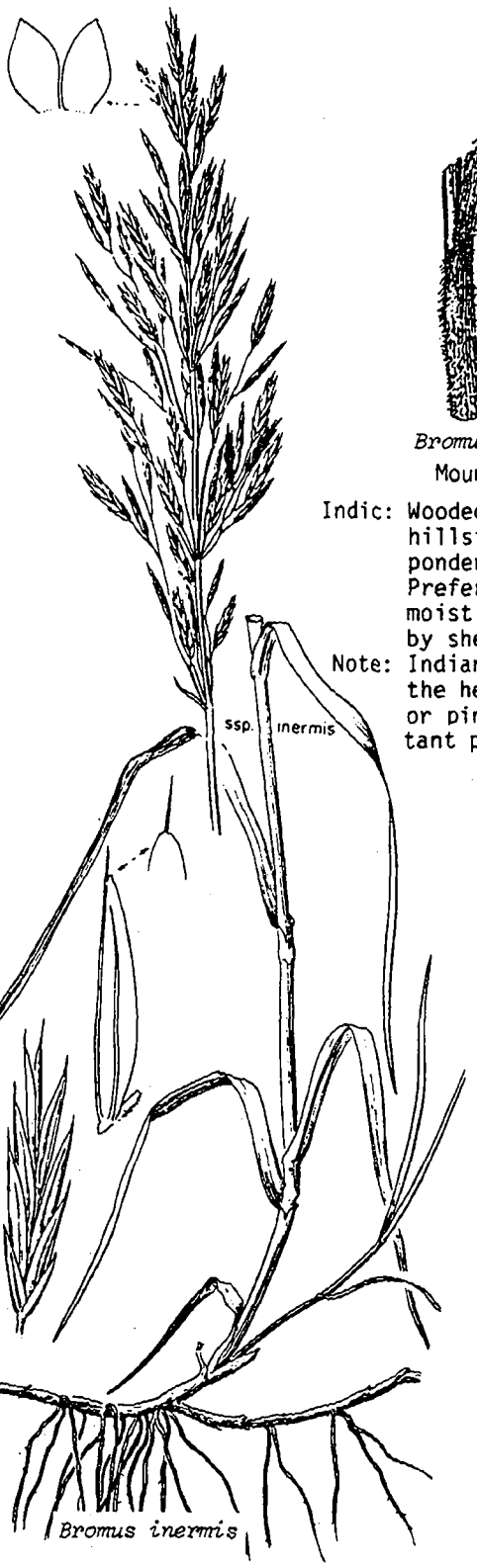
Slender Wheatgrass

Indic: High tolerance to alkali soils;helps control erosion. Good forage grass. Near coast to subalpine or alpine meadows, ridges and stream borders.

Agrostis alba

Redtop

Indic: Thrives on wet or moist soils; best on rich sandy clay loams. Wet, moist meadows, openings in timber, stream banks and moist canyon bottoms. Fair forage for sheep, good forage for elk.



Bromus inermis

Smooth Brome

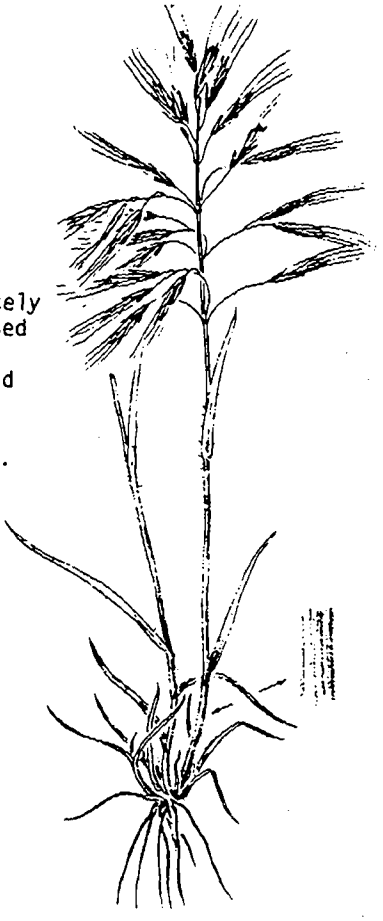
Indic: Domestic grass seeded on disturbed sites in better pine and fir sites; strongly rhyzomatious and tends to inhibit tree regeneration. Moderate palatability, use in spring or after fall rains. Good for stablizing soils and grows well in moist and dry meadows with both the ponderosa pine and fir zone.

Bromus marginatus

Mountain Brome

Indic: Wooded slopes and grassy hillsides. Grows well in ponderosa pine forest. Prefers deep rich moderately moist soils. Seedheads used by sheep and horses.

Note: Indians parched and ground the heavy seeds into meal or pinole. Locally important pocket gopher forage.



Bromus tectorum

Cheatgrass Brome

Indic: Severe overgrazing and/or site disturbance when dominant; present in most moderate to good site sage and bunchgrass types; tends to indicate fair to good soil.

Note: Awns on fruits can cause sores in animals mouth and eyes.

Dactylis glomerata

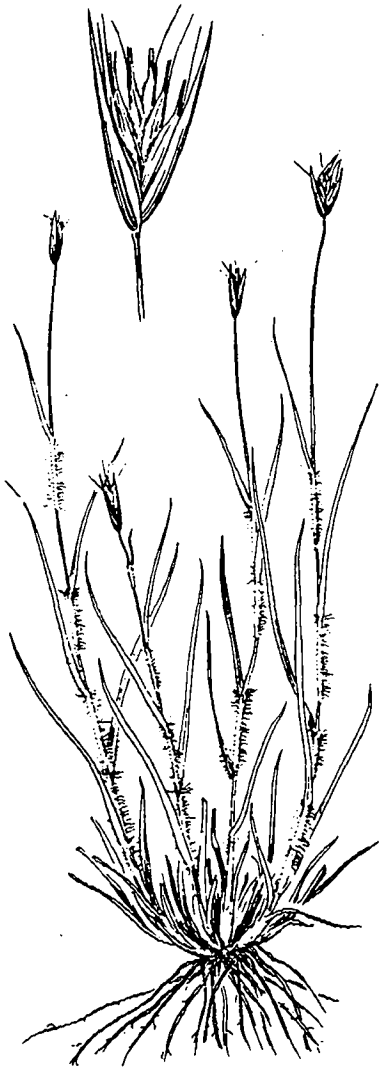
Orchardgrass

Indic: Past logging or road construction and seeding of domestic grass; grows best on moderate to very good forest sites. Highly palatable and nutritious, decreases with overgrazing; competes less with tree regeneration than will other domestic seeded species.

Danthonia californica

California Oatgrass

Indic: Minor component in good condition dry meadow; decreaser.



Danthonia unispicata

Onespike Oatgrass

Indic: Stony soils often up to 24" deep; spring and fall moisture saturation; tends to decrease with overgrazing

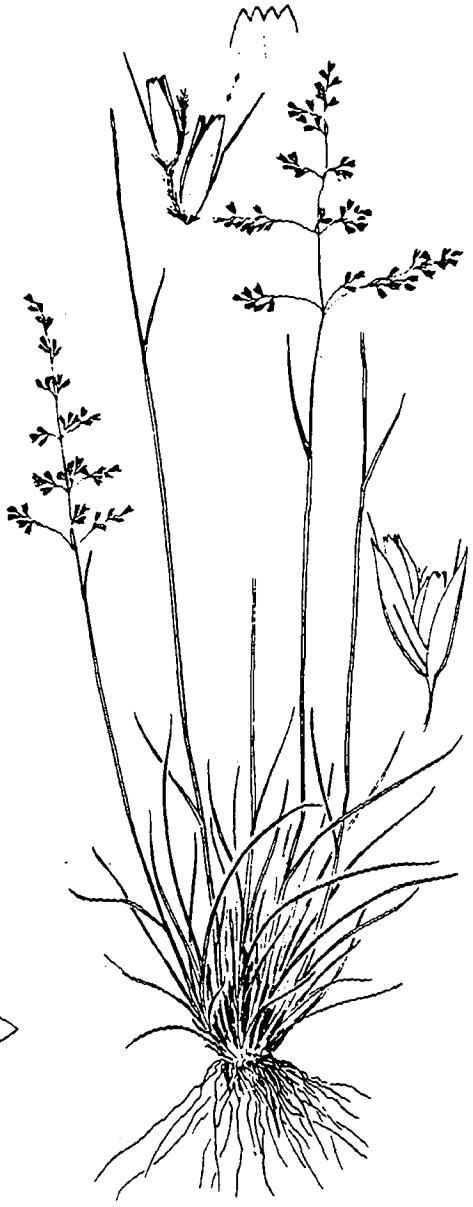
Note: Plant produces seedheads apomictically (viable seed not fertilized).

Elymus cinereus

Giant Wildrye

Indic: Usually grows in moist or wet places; bottomlands, along streams and ditchbanks; also in moderately rich,dry soils. Grazed by cattle and horses.

Note: Cut for hay, may become ergot infested which can poison livestock. Fruits used as food by indians.



Deschampsia caespitosa

Tufted Hairgrass

Indic: Moist and wet meadows in fair to good condition; decreases with heavy grazing; good palatability to cattle and moderate to sheep.

Festuca arundinacea

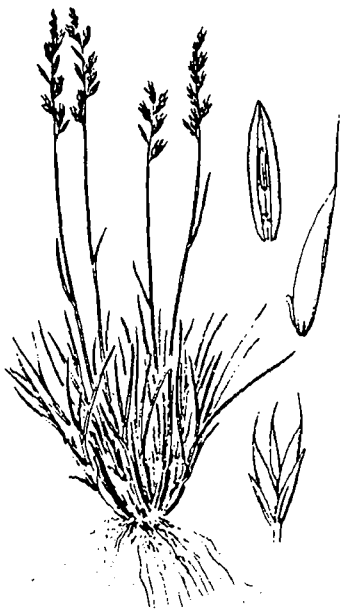
Reed Fescue (Tall Fescue)

Indic: Grows well on relatively cold soils; tolerant of poor drainage; grows well in irrigated pastures and tolerant of alkalinity and saline conditions. Heavy turf, good hay production.

Festuca idahoensis

Idaho Fescue

Indic: Without trees: Moderate to deep (24") non-forested soils; good range seeding potential. Fair to good palability; decreaser.
With trees: Fair ponderosa pine site; usually found with bitterbrush and/or manzanita; decreaser.



Festuca ovina

Hard Fescue

Indic: Open hillsides, meadows, open woods and woodlands to lightly timbered areas. Favors dry, sandy,gravelly or rocky soils. Found on fine clay soils.

Festuca rubra

Red Fescue

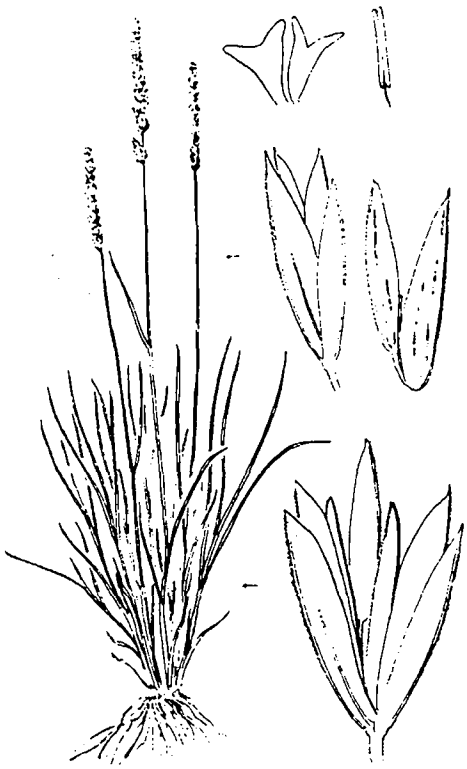
Indic: High elevation (7000') sites; associated with low sagebrush, granite gilia and sandwort. Moderate palatability.

Hordeum brachyantherum

Northern Meadow Barley

Indic: Moist meadow. Fair to good palatability; graze early; increaser.

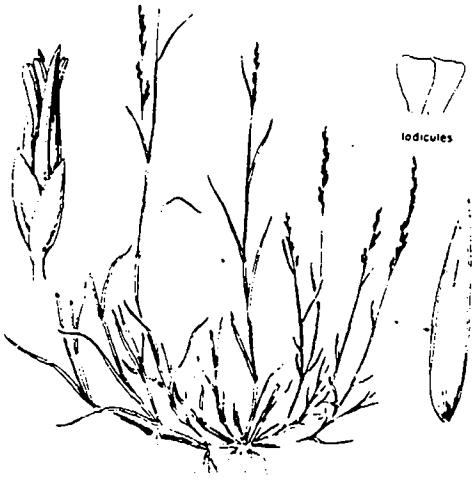
Note: Fruits of several species of barley used by indians to make parched seed flour and a coffee substitute from toasted seed coats.



Koeleria cristata

Prairie Junegrass

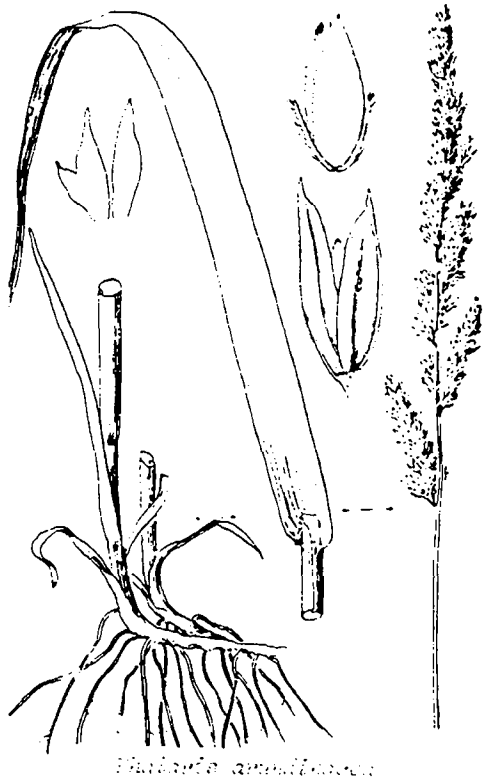
Indic: Shallow to moderately deep soils on low sagebrush/bunchgrass types. Spring soil saturation or more moist sites. Decreaser.



Muhlenbergia filiformis

Pullup Muhly

Indic: Dry and moist meadows as inconspicuous understory grass species. Increaser.



Phalaris arundinacea

Reed Canarygrass

Indic: Introduced species; poorly drained soils: drought tolerant. Suffers winter kill, often grows in bunches. Fair to good palatability.

Note: Used for pasture hay, high hay yield. Excellent for streambank and gully erosion control.

Phleum alpinum

Alpine Timothy

Indic: Alpine and subalpine settings; fir and aspen zones. Grows in moist or wet meadows, along streambank and in well-drained sites. Good palatability for cattle, horses, and sheep.

Phleum pratense

Timothy

Indic: Past logging or road construction and seeding of domestic grass; grows best on moderate to very good forest sites. Commonly seeded with orchardgrass; very good palatability; excellent for seeding disturbed sites.

Poa nervosa

Wheeler's Bluegrass

Indic: Increases with site disturbance, decreases with overgrazing. Fair palatability. Occasional regeneration problems.

Poa nevadensis

Nevada Bluegrass

Indic: Plains, dry meadows and open hillsides; prefers open woods, slopes and foothills. On dry, infertile, loose sandy or loamy soils. Very palatable to game and livestock.

Poa pratensis

Kentucky Bluegrass

Indic: Dry to moist meadows with soils generally dark brown to black. Difficult to severe regeneration problems; high to very high grazing capacity; good meadow seeding potential.

Poa sandbergii

Sandberg Bluegrass

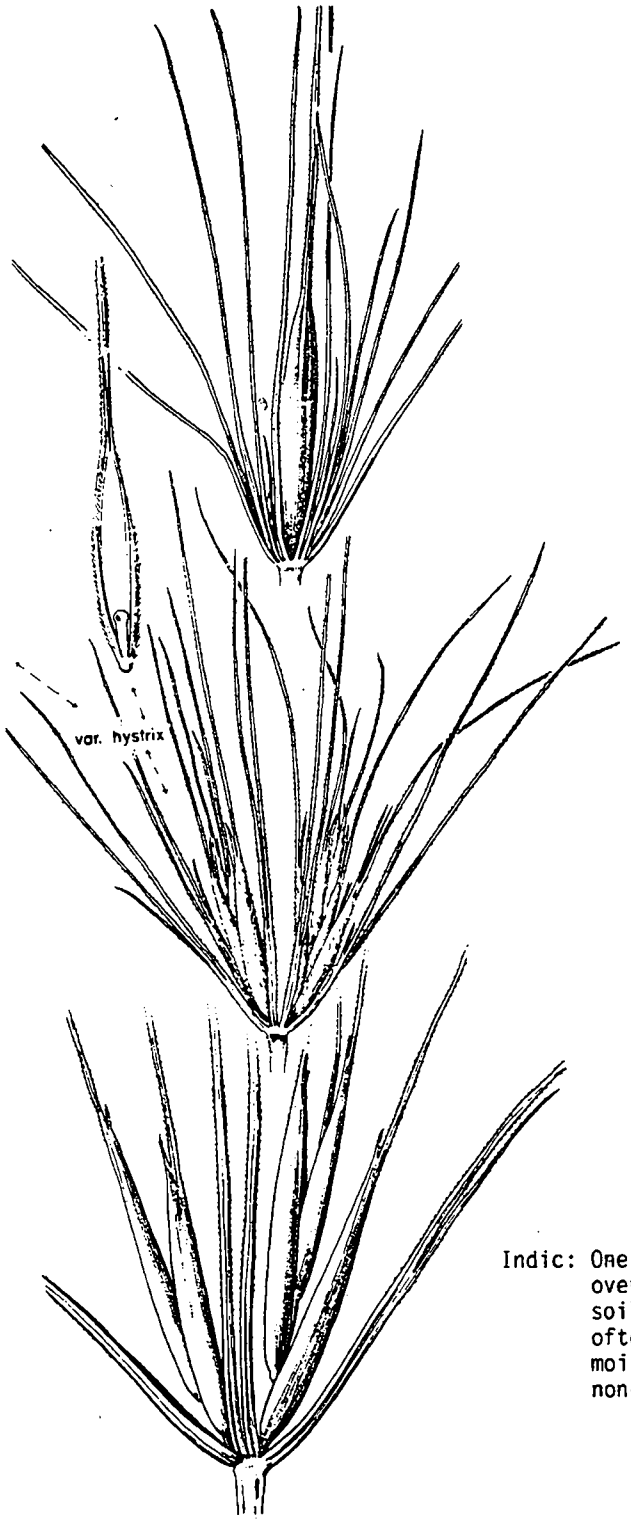
Indic: Very widespread plant, from very shallow soil scablands to ponderosa/fescue and ponderosa/bitterbrush types; limited value for indicating environmental conditions; tends to increase with livestock overgrazing but decreases with game overgrazing.

Secale cereale

Winter Rye

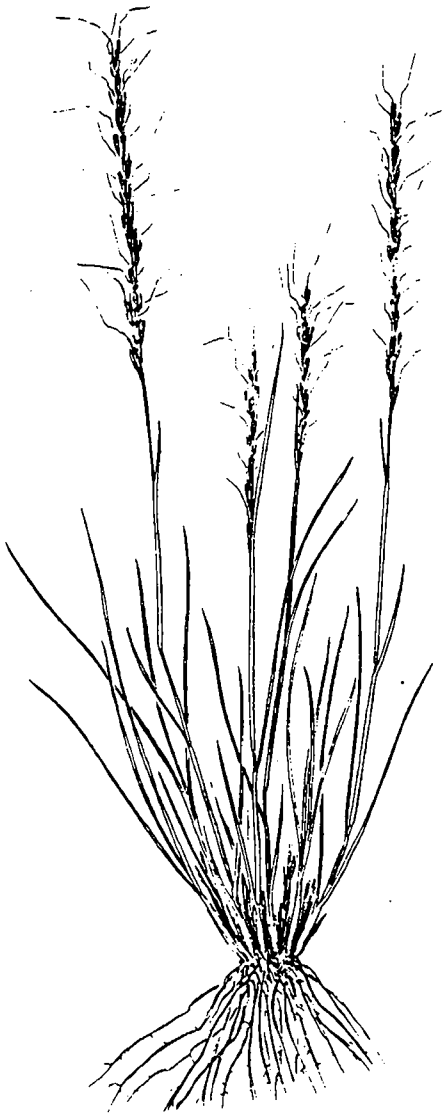
Indic: Resembles wheat but usually taller. Commonly cultivated but escapes into fields and waste places; cultivated on dry, poor soil.

Note: Rapid root development to stabilize soils.



Sitanion hystrix

Bottlebrush Squirreltail



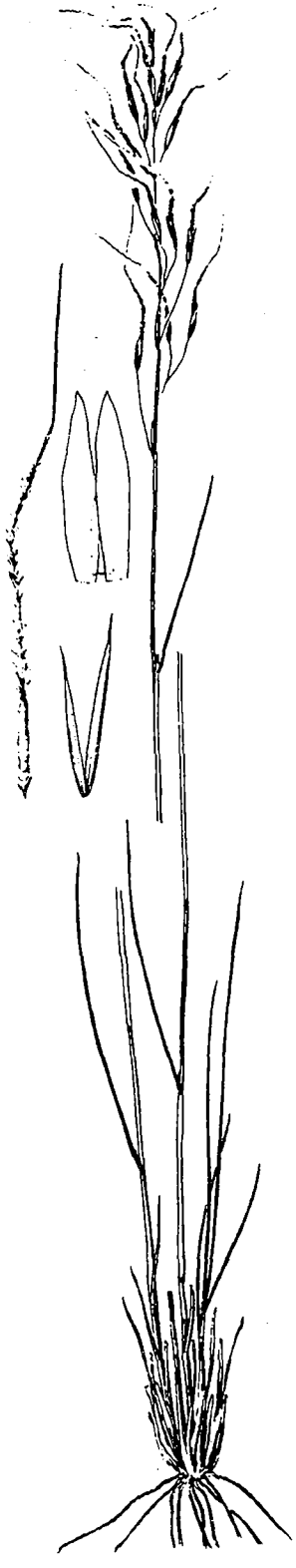
Stipa occidentalis

Western Needlegrass

Indic: One of several varieties that tend to increase with overgrazing and site disturbance; moderate to deep soils in sage, bunchgrass and forest types. Soils often low in fertility in forested setting; dry to moist forest savanna and poor quality commercial to non-commercial forest lands.

Indic: Without Trees: Increaser with overgrazing; abundance indicates fair to poor range condition;fair to good sage and bunchgrass sites.

With Trees: Tends to increase with overgrazing and site disturbance; tends to indicate low fertility soils and poor to very poor sites.



Stipa thurberiana

Thurber Needlegrass

Indic: Ridges, open timber and open hillsides; sagebrush and ponderosa pine woodlands.

Triticum aestivum

Wheat

Indic: Commonly cultivated annual; excellent for quickly establishing soil stabilization following fire or logging.

Note: Introduced in southwest by the Spaniards.

Carex amplifolia

Bigleaf Sedge

Indic: Wet places, lowlands to mid-mountain swamps or bogs. Very large robust sedge; thick, tough stems.

Carex aquatilis

Water Sedge

Indic: Shallow water or wet places, foothills to near timber lands. Often along edges of streams or lakes or ponds.

Carex microptera

Smallwing Sedge

Indic: Wet to moist meadows in fair to good condition; decreases with heavy grazing; palatable to highly palatable; one of many "ovalhead sedges."

Carex nebraskensis

Nebraska Sedge

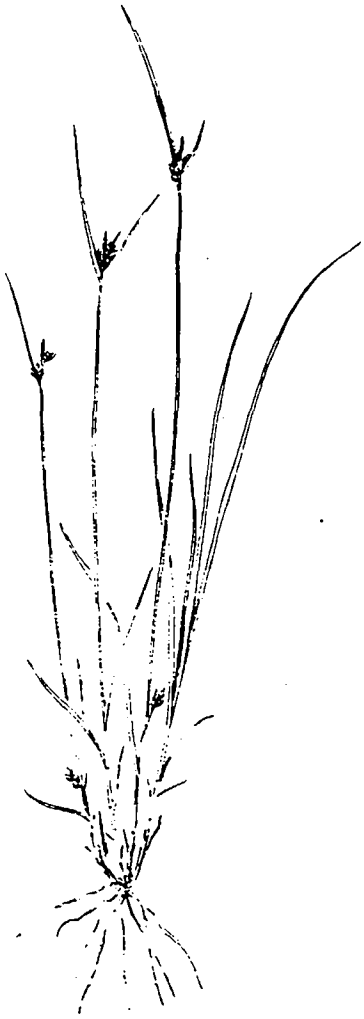
Indic: Wet meadows in good to fair condition;most common wet meadow indicator; decreaser with heavy grazing.

Note: Common component of wild hay; soil depth and water table influence height of plant and will range from 8-12" up to 36" at peak condition where adequate soil depth and water availability is found.

Carex pensylvanica

Long-Stolon Sedge

Indic: Mid to high elevation; rhizomatous; associated with high elevation lodgepole pine and mixed conifer stands; increases with disturbance. Locally important pocket gopher forage.



Carex rossii

Ross' Sedge

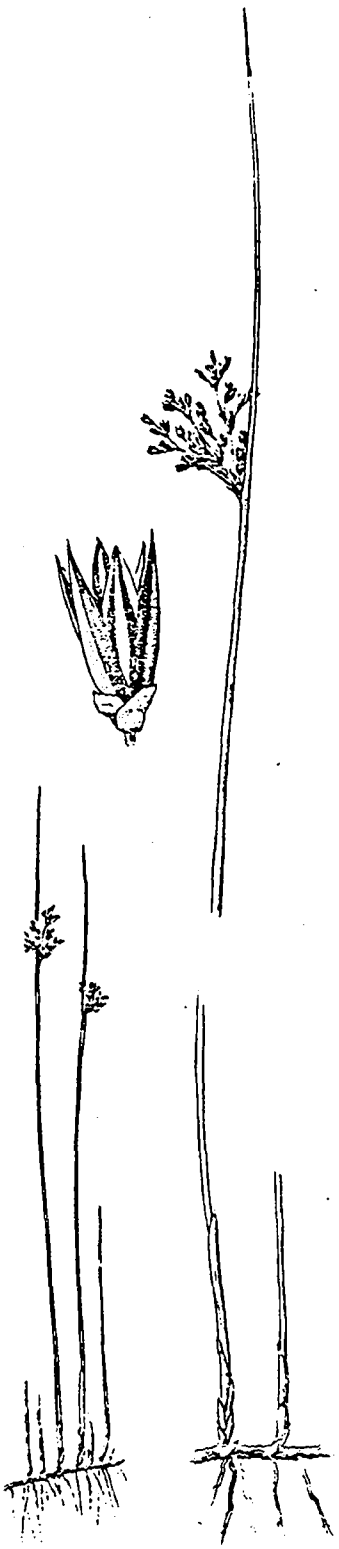
Indic: Several indicator values; increases after logging and overgrazing in all types. In undisturbed settings, indicates shallow, low fertility soils.

Carex rostrata

Beaked Sedge

Indic: Soils usually moderately fertile with favorable moisture conditions; moist to wet meadows. Important in soil stabilization, prevents soil loss. Lowland and mid-montane, common and widespread. Large sedge; tough stems.

Note: Indians used sedge roots in basket making.



Juncus balticus

Baltic Rush

Indic: Prefers moist or wet, deep, organic meadow soils. Found with sedges, bluegrasses and rushes. Common in shallow ponds or other wet places.

Note: Indians made baskets and mats from stems.

Antennaria geyeri

Pinewoods Pussytoes

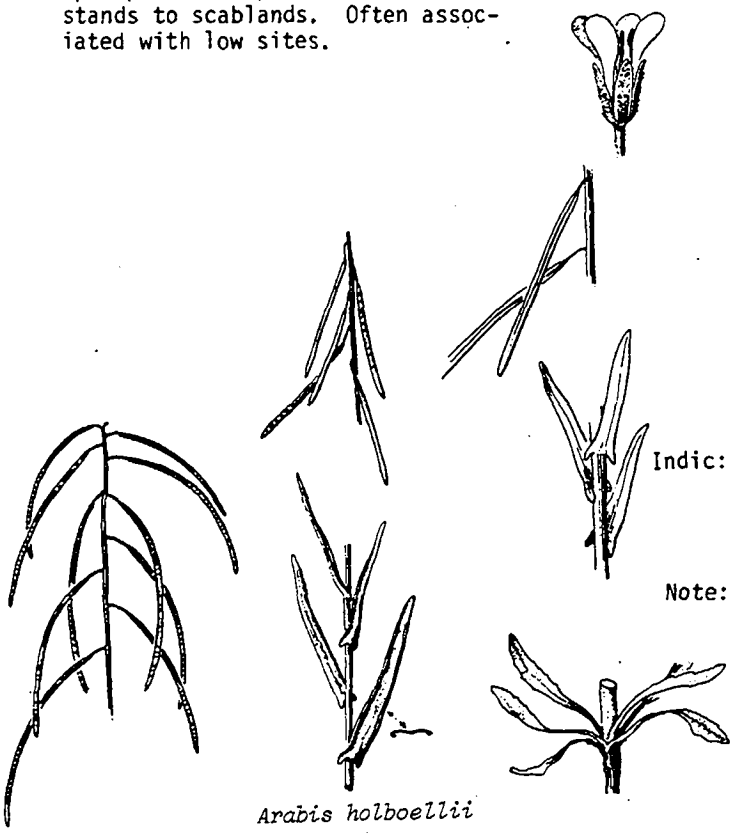
Indic: Open ponderosa pine woods and fir stands to scablands. Often associated with low sites.

Achillea millefolium lanulosa

Western Yarrow

Indic: Widely distributed in most communities, from low sage through all types of forest to "alpine conditions." Often increases with overgrazing and site disturbance. Heads palatable to game.

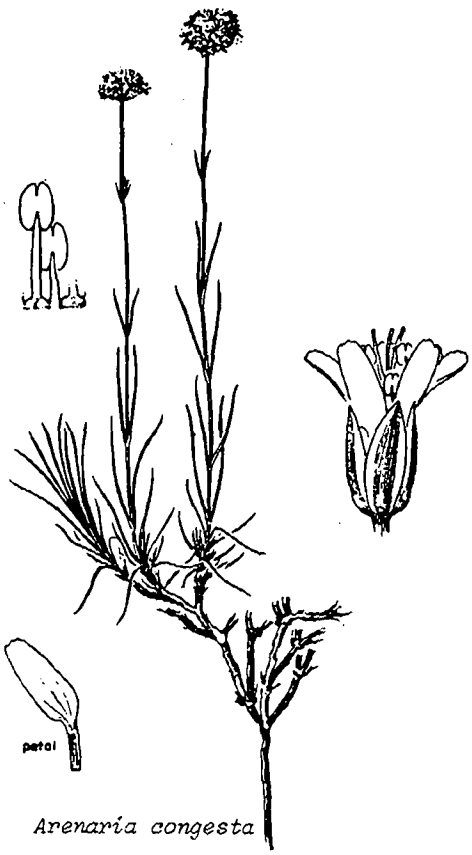
Note: Entire plant dried, ground, boiled to remedy run-down condition or digestion disorders; leaves used to stop bleeding and heal rashes; leaves make a pleasant smoke.



Arabis holboellii

Holboell Rockcress

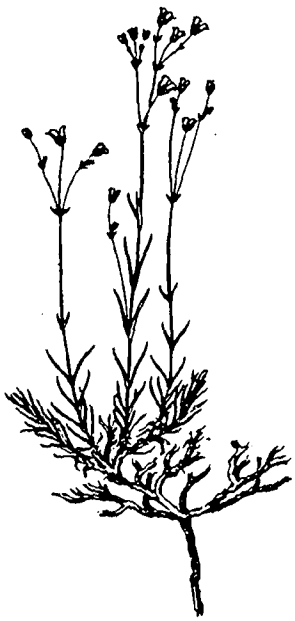
Indic: Sagebrush plains to ponderosa pine and as high as subalpine ridges. Increaser.



Arenaria congesta

Ballhead Sandwort

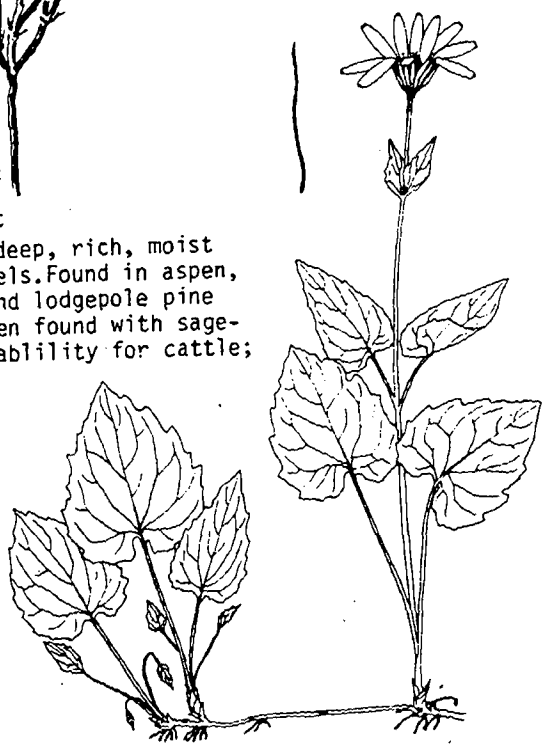
Indic: Soils range from deep, rich, moist loams to dry gravels. Found in aspen, ponderosa pine, and lodgepole pine communities. Often found with sagebrush. Low palatablility for cattle; poor for sheep.



Arenaria kingii

King's Sandwort

Indic: High elevation (7000') grasslands and openings in lodgepole pine-whitebark pine stands.



Arnica cordifolia

Heartleaf Arnica

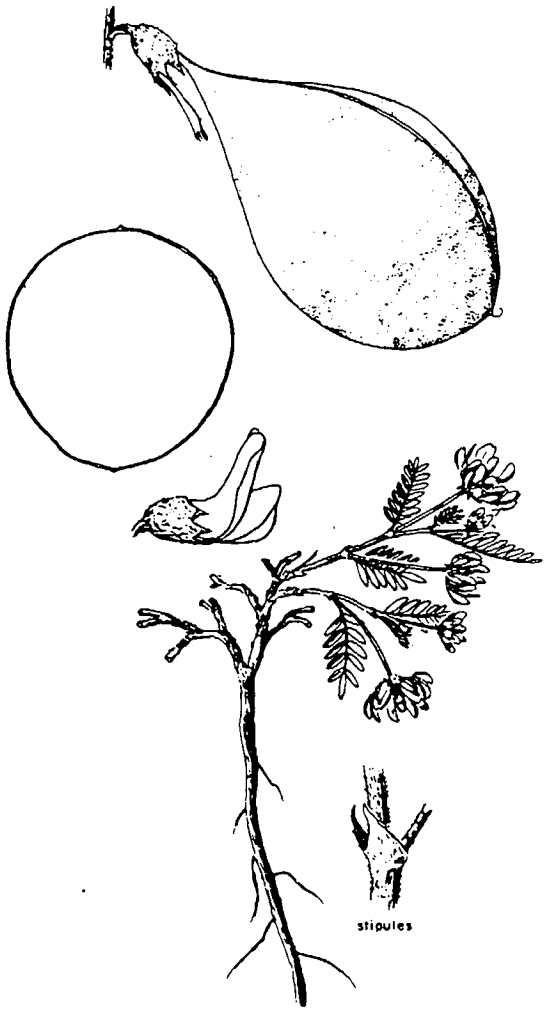
Indic: Fir climax, often found in mixed ponderosa and fir stands; increases with overgrazing and increase in canopy cover.

var. occidentalis *var. intermedius*

Aster occidentalis

Western Aster

Indic: Good palatability for game animals, low for livestock. Found on most soils at most elevations up to timberline.



Astragalus whitneyi

Balloonpod Milk Vetch

Indic: Montane slopes to alpine summits; open stony slopes and mountain crests.

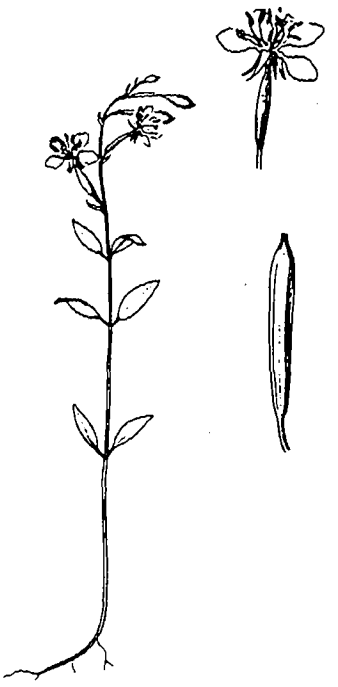
Note: Indians ate roots of a related species. Several species are poisonous (locoweed and Z-grooved milk vetch) and closely resemble balloonpod milk vetch.

Balsamorhiza saggittata

Arrowleaf Balsamroot

Indic: Stony soils with big sagebrush and bunchgrass types; in ponderosa pine savanna sites. Indicates moderate to difficult range seeding; decreases with overgrazing; heads highly palatable to big game and livestock.

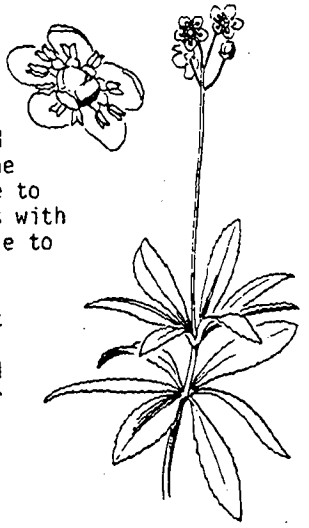
Note: Entire plant edible; roots may be collected all year, edible raw but best cooked; young stems eaten as salad, older stems cooked; roasted seeds excellent, ground into flour and added to bread.



Clarkia rhomboidea

Clarkia

Indic: Easily grown, suitable for dry ground; grows in open wooded areas or in gravelly grassy areas. Blossoms late in season.

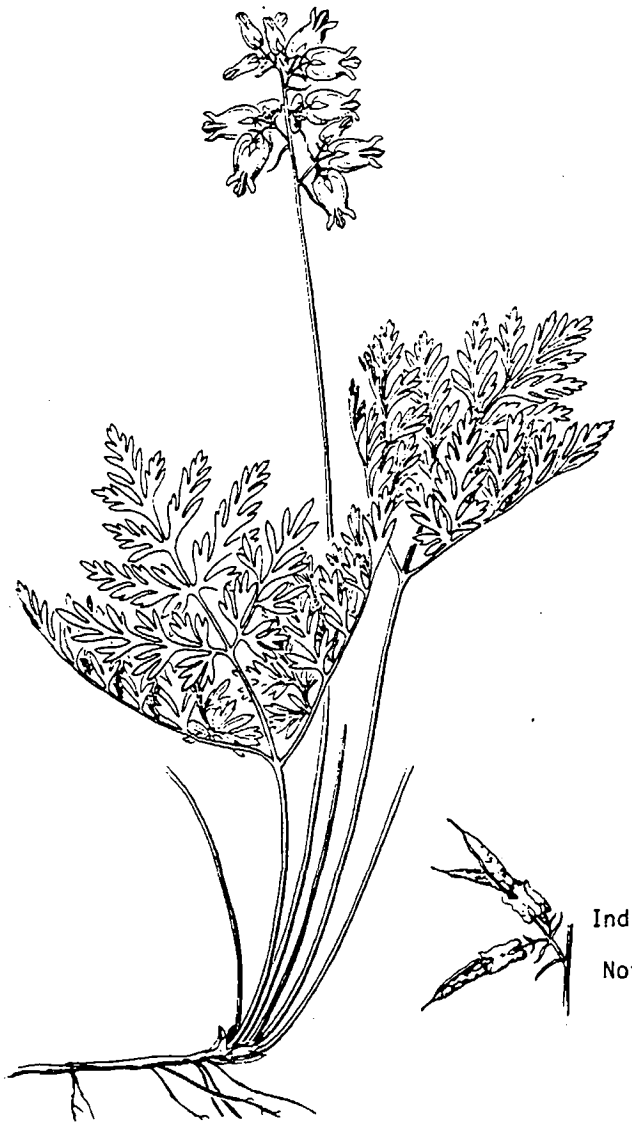


Chimaphila umbellata

Prince's Pine

Indic: Good forest sites; in conjunction with twin-flower, indicates best fir sites; generally easy regeneration; widespread and grows to approximately 6" in height.

Note: Roots and leaves boiled for drink; leaves used in medicine as astringent; plant an ingredient in root beer.



Dicentra formosa

Bleedingheart

Indic: High elevation; mixed stands; often in rocky sites.
Note: Plants contain isoquinoline, an alkaloid. Cattle have died from eating this plant.

Digitalis purpurea

Foxglove

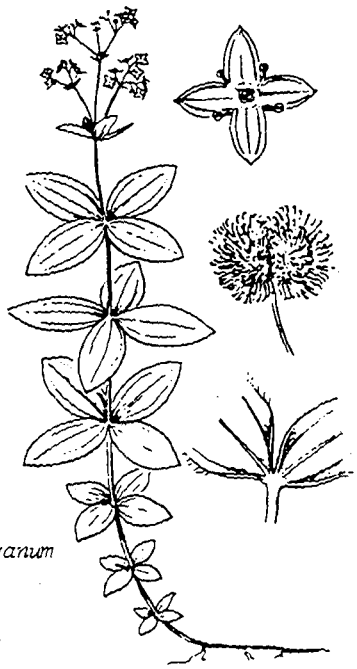
Indic: Well established in disturbed sites, along roadsides.
Note: Drug digitalis is derived from this plant. All parts contain toxin which affects heart.

Epilobium angustifolium

Fireweed

Indic: Occurs on newly burned-off forest sites, in natural openings in timbered stands, and along streams. Ranges from dry to moist settings on gravelly soils to deep loams. Palatability good for sheep, poor for cattle. Grazed by deer and elk.

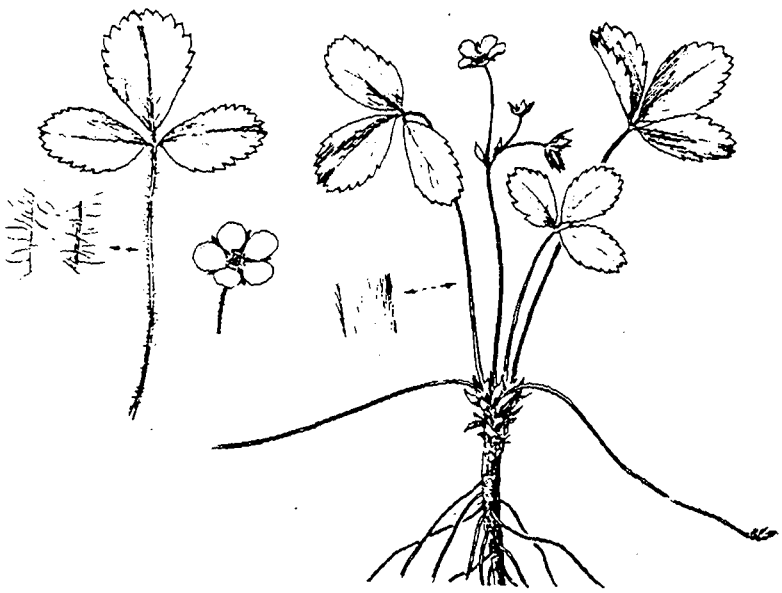
Note: Indians used cotton of plant in blankets. Roots boiled for sore throats and tuberculosis. Boiling whole plant makes a poison.



Galium oreganum

Bedstraw

Indic: Moist woods and meadows. Found from sea level up to mid-elevations.

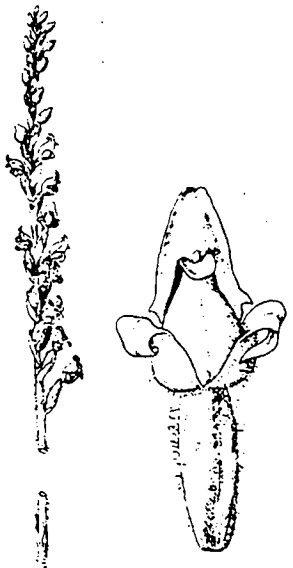


Fragaria virginiana

Broadleaf Strawberry

Indic: One of several strawberries, all are widely distributed and do not have specific indicator value; tends to increase with over-grazing and site disturbance.

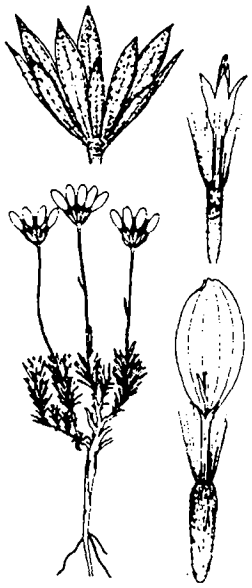
Note: Fruit quite edible; tea made from green leaves.

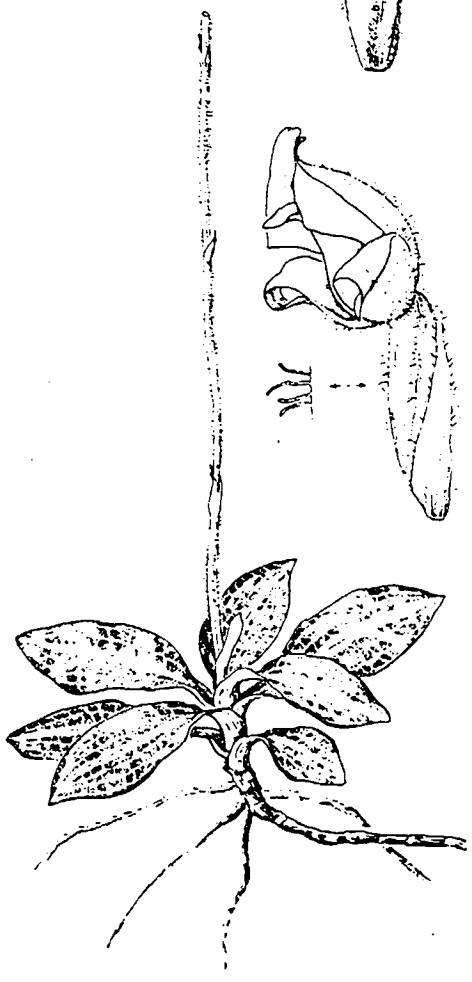


Haplopappus stenophyllus

Narrowleaf Goldenweed

Indic: Creeping plants 4-6" in height on very shallow (6-8") soil; scablands associated with sandberg bluegrass; very harsh site.





Goodyera oblongifolia

Western Rattlesnake-Plantian

Indic: Most productive forest sites;white fir and Douglas-fir climax.

Note: Indians applied mashed leaves to prevent thrush (mouth infection) in infants.

Hieracium albertinum

Hieracium albiflorum

Hawkweeds

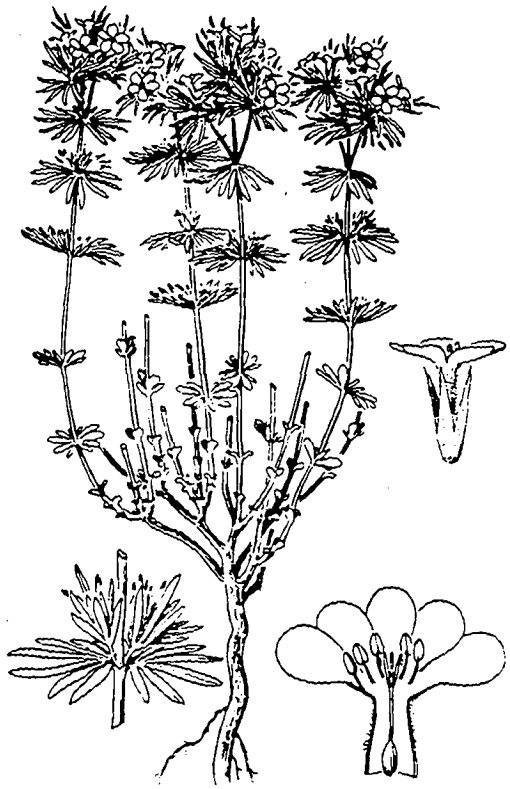
Indic: Widespread; common in all forested types.

Note: Green plants and their coagulated juice used by indians as chewing gum.

Horkelia fusca capitata

Tawny Hawkweed

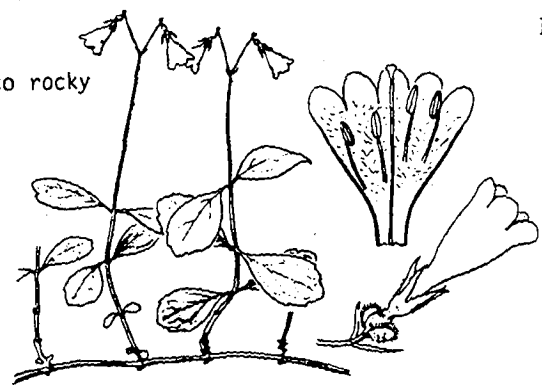
Indic: Moist meadows to rocky hillsides.



Linanthastrum nuttallii

Linanthastrum

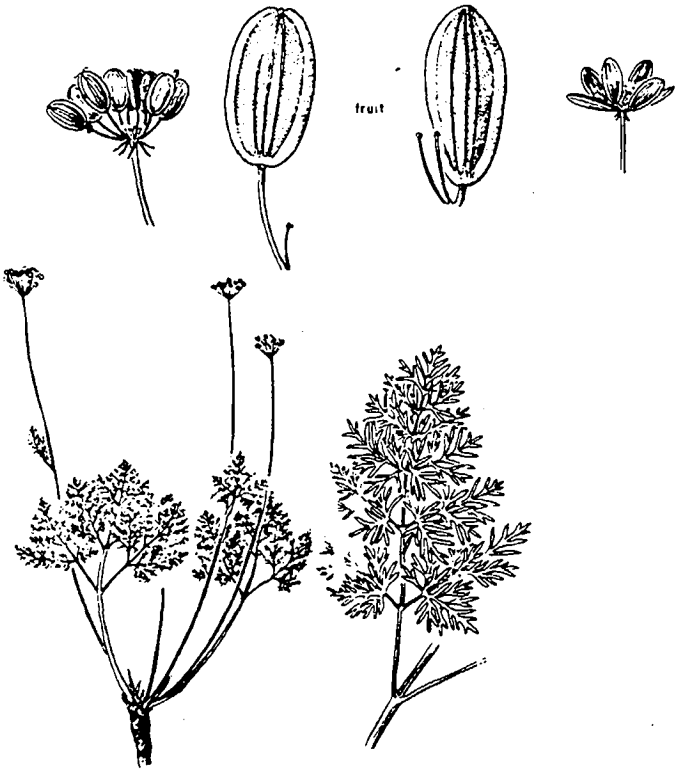
Indic: Rocky slopes at upper elevations; found on deep pumice, lodgepole pine sites, and associated stands.



Linnaea borealis

Twinflower

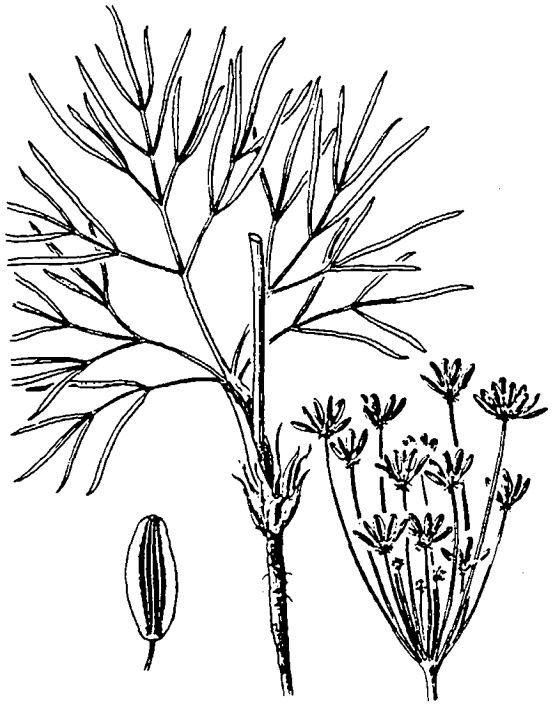
Indic: In highly productive fir forest; generally easy regeneration; rather low forage producing community unless seeded to domestic grass following logging. Trailing half-shrub less than 6" tall.
Note: Excellent ground plant for garden. Indians boiled leaves for cold.



Lomatium dissectum

Fernleaf Biscuitroot

Indic: Open, low sagebrush communities; dry meadows. Increaser.



Lomatium triternatum

Nineleaf Biscuitroot

Indic: Plant of foothills and lower mountains. On well drained or dry, rocky sites on sunny slopes, flat open ridges, and under open stands of timber in sagebrush, and ponderosa pine stands. Associated with wheatgrass, sagebrush, and bitterbrush.

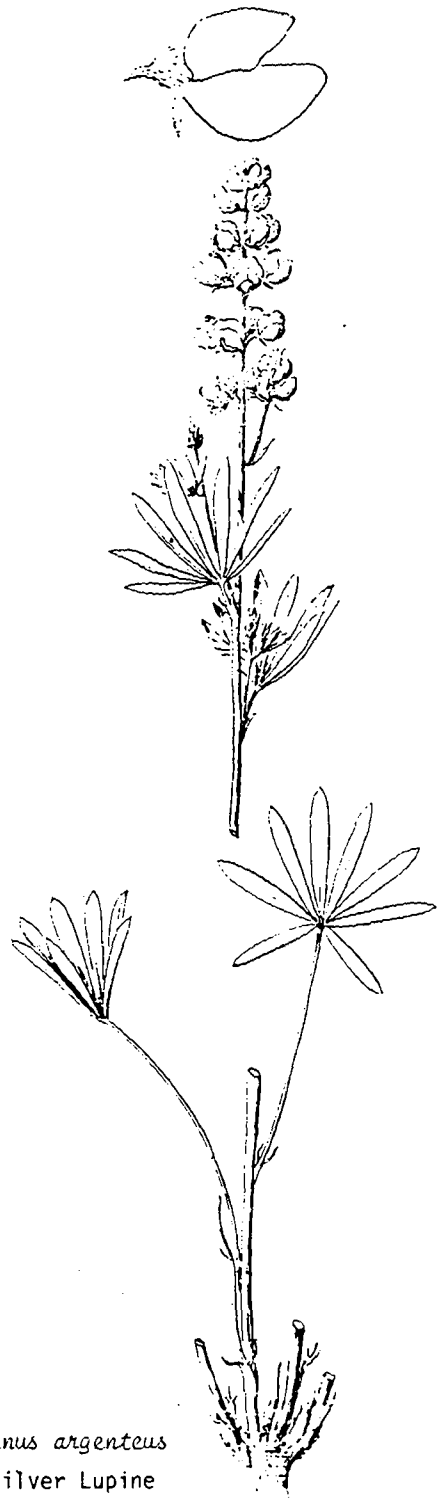
Note: Indians ate roots raw, cooked as a vegetable, or diced and ground into a flour for bread.

Lupinus albicaulis

Pine Lupine

Indic: Mid-elevation to high elevation. Found in ponderosa pine-white fir stands; increases.

Note: This plant is poisonous and should be avoided. Important forage for pocket gophers.

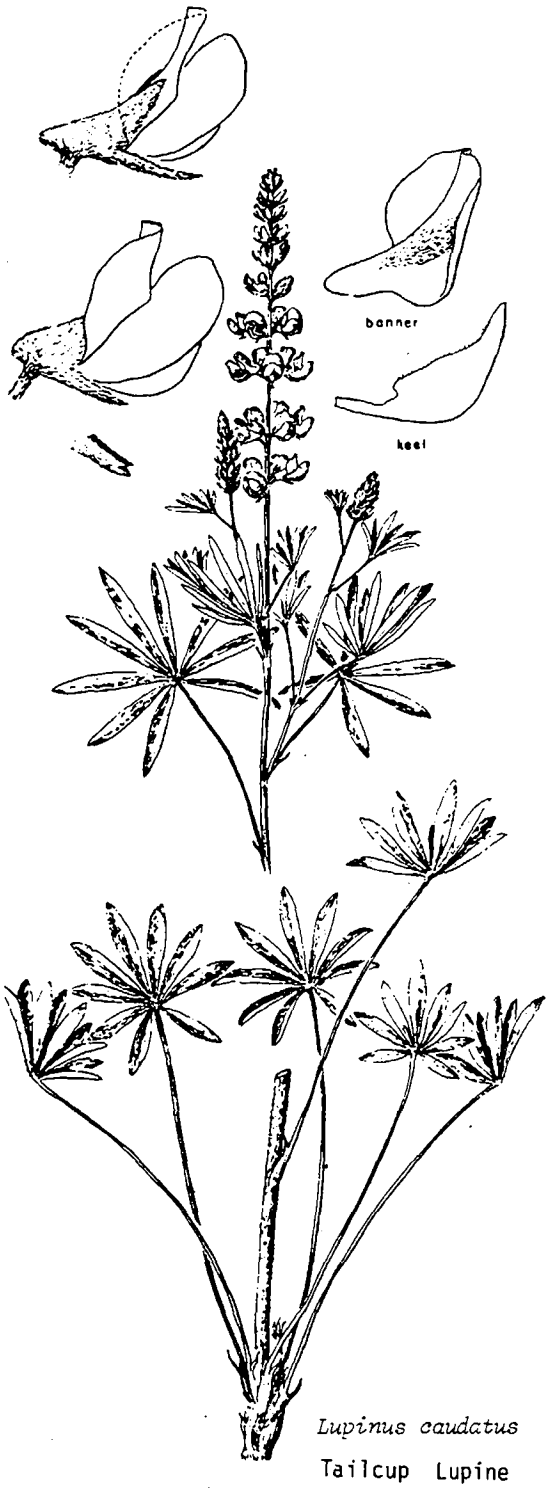


Lupinus argenteus

Silver Lupine

Indic: Dry, well-drained soils, sagebrush to open coniferous timber stands, common in ponderosa pine zone. Associated with fescue and bitterbrush. Livestock will graze plant but is poisonous.

Note: This plant is poisonous and should be avoided. Important forage for pocket gophers.

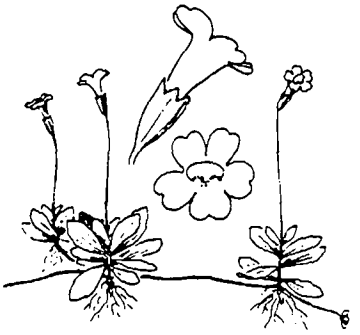


Lupinus caudatus

Tailcup Lupine

Indic: Associated with ponderosa pine sites that are low to moderate in productivity, moderate to good fir sites. Often found on deep pumice soils with lodgepole pine. Generally dry, well-drained soils. Increases with overgrazing.

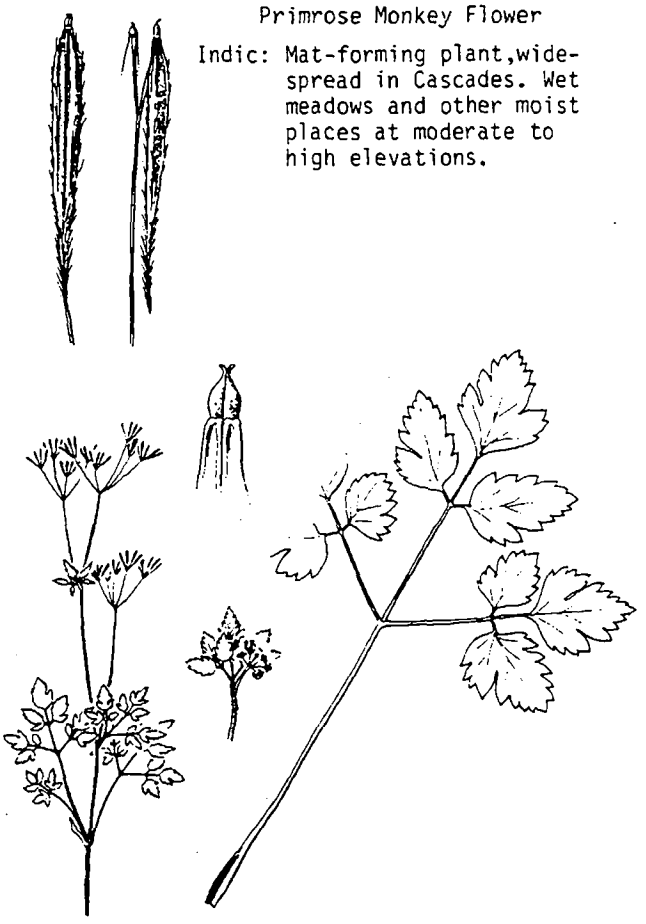
Note: Plant is highly palatable, and particularly poisonous to cattle and horses. Indians made tea from seeds to help kidney funtion. Important forage for pocket gophers.



Mimulus primuloides

Primrose Monkey Flower

Indic: Mat-forming plant, widespread in Cascades. Wet meadows and other moist places at moderate to high elevations.

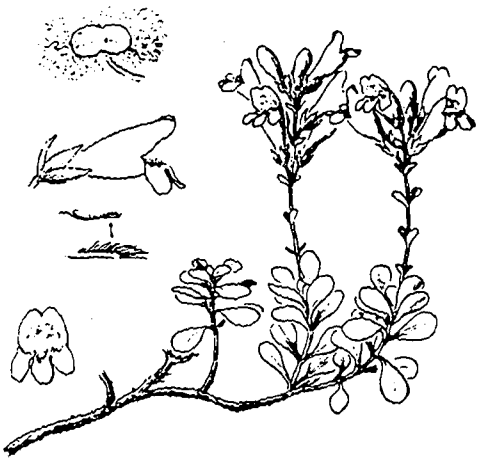


Osmorhiza chilensis

Mountain Sweetroot

Indic: Fair ponderosa pine site; good fir and mesic tending sites. Palatable to game and livestock; decreases with overgrazing.

Note: Roots anise-flavored, makes good seasoning.



Penstemon davidsonii

Davidson Penstemon

Indic: Dense mats with creeping woody stems. Ledges among rocks, sometimes on talus, moderate to high elevation.

Phacelia hastata

Phacelia

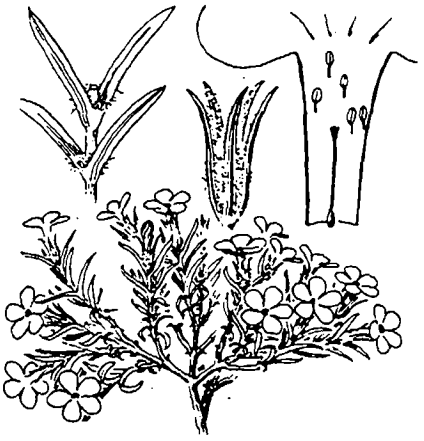
Indic: Dry, open places at all elevations, often in sand.

Penstemon laetus

Gay Penstemon

Indic: Sagebrush and ponderosa pine zones. Dry, open, often rocky or gravelly slopes and flats.

Note: Navajos applied a wet dressing of the pounded leaves to snake bite.



Phlox diffusa

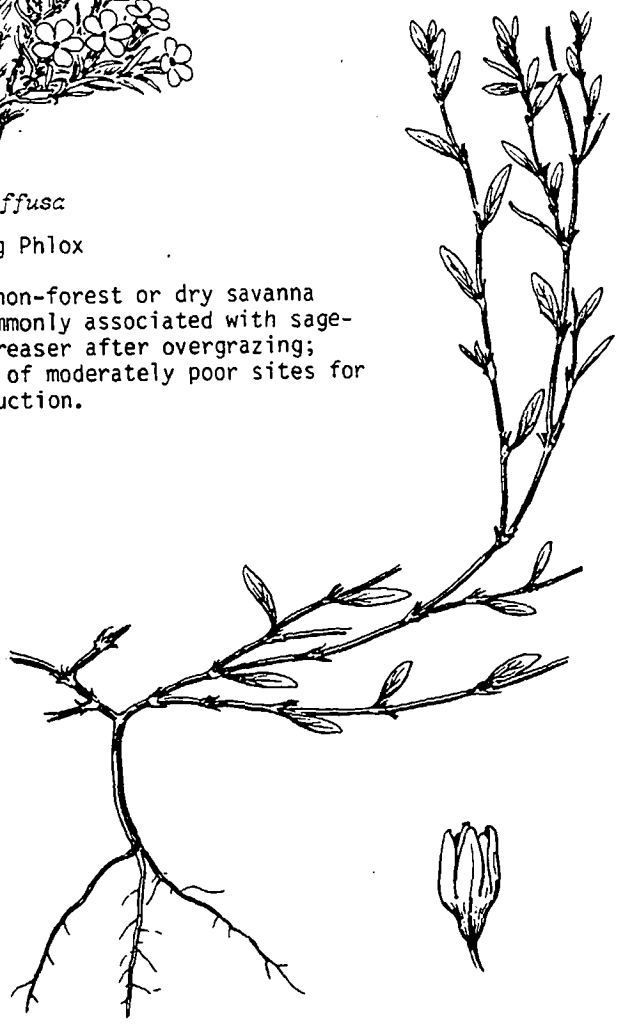
Spreading Phlox

Indic: Generally non-forest or dry savanna forest; commonly associated with sagebrush; increaser after overgrazing; indication of moderately poor sites for grass production.

Phlox musciodes

Moss Phlox

Indic: Dry, rocky foothills to high elevation non-forested sites; usually with low sagebrush.



Polygonum aviculare

Knotweed

Indic: Weedy, widespread often on very poor soil.
Note: Tea from plant used to treat urinary problems.

Polygonum majus

Wiry Knotweed

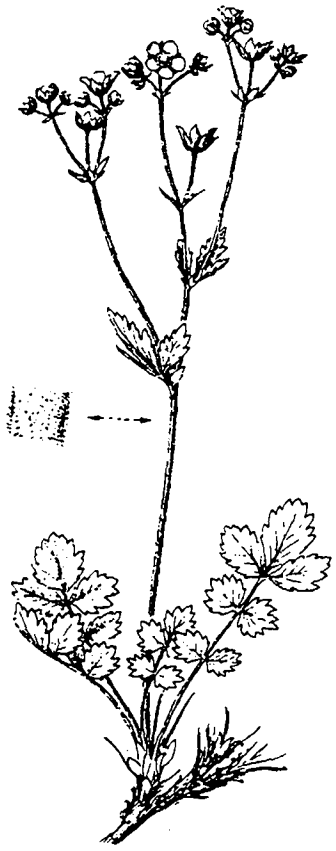
Indic: Dry, light to heavy soil, sagebrush desert to ponderosa pine forest on montane slopes. Dry semibarren, gravelly to heavy soils.

Polygonum bistortoides

American Bistort

Indic: Past heavy grazing on moist to wet meadows; better sites in meadows; increases to level of invader; low in palatability.

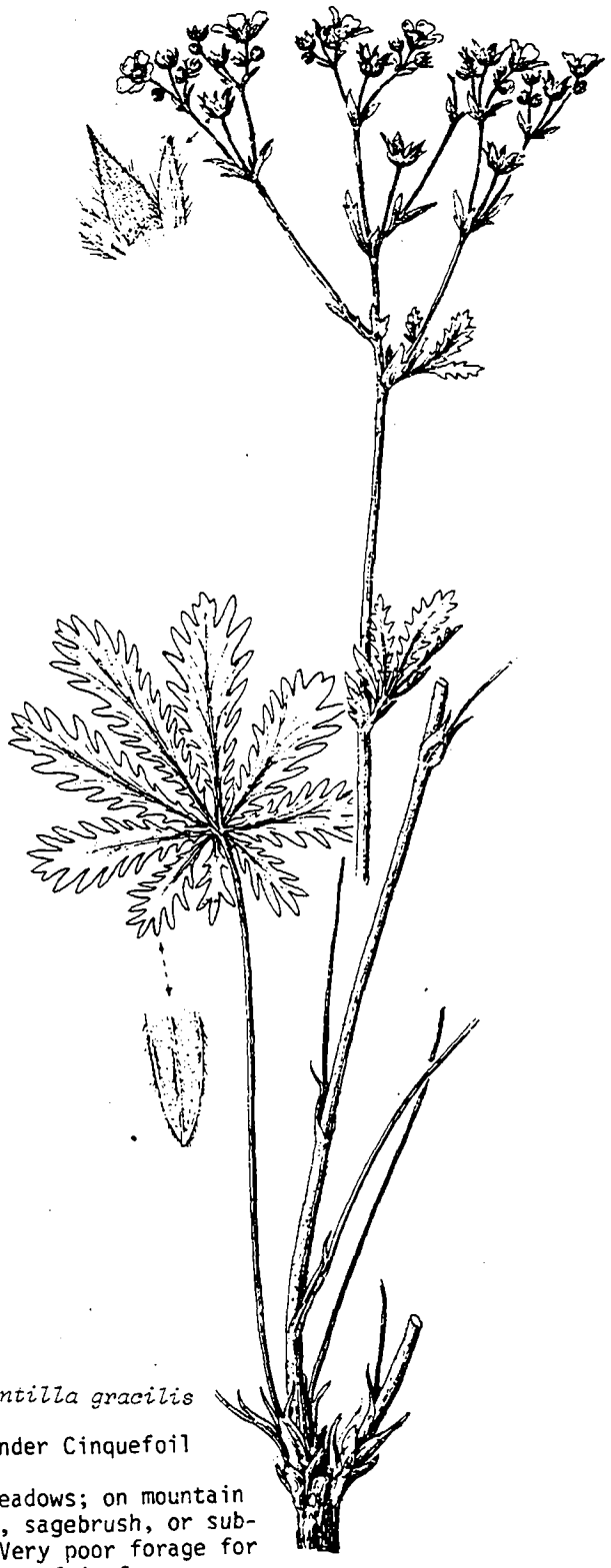
Note: Starchy root edible raw, cooked, best roasted; seeds may be used whole or ground into flour.



Potentilla glandulosa

Gland Cinquefoil

Indic: Dry to moist meadow; will dominate site with heavy livestock grazing, increaser.

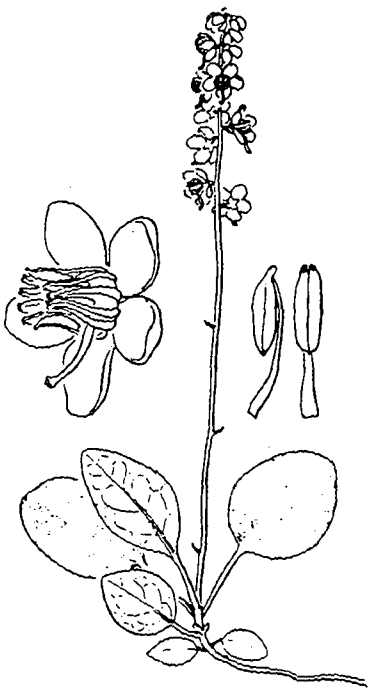


Potentilla gracilis

Slender Cinquefoil

Indic: Rich loams of meadows; on mountain slopes in aspen, sagebrush, or subalpine meadow. Very poor forage for livestock; poor to fair for game.

Note: Tea made from leaves or whole plant. Indians used as astringent.



Pyrola picta

Whitevein Pyrola

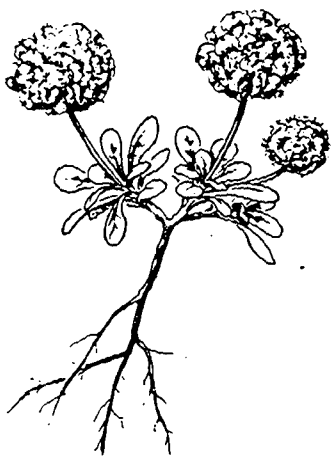
Indic: Associated with mixed coniferous stands that are composed of Douglas-fir and/or white fir, pines common.

Smilacina stellata

Starry Solomonplume

Indic: Moist, good to very good fir site; fir climax; easy regen.

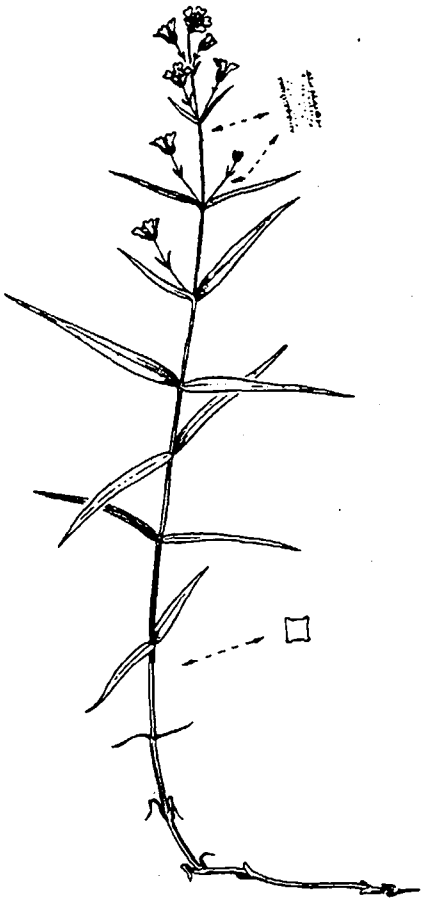
Note: Berries edible raw but tend to loosen the bowels. Cooking enhances flavor and greatly reduces the purgative.



Spraguea umbellata

Umbellate Pussypaws

Indic: Mat forming; pine woods to subalpine ridges. Sandy flats and knolls. Low elevation, annual; high elevation, perennial.

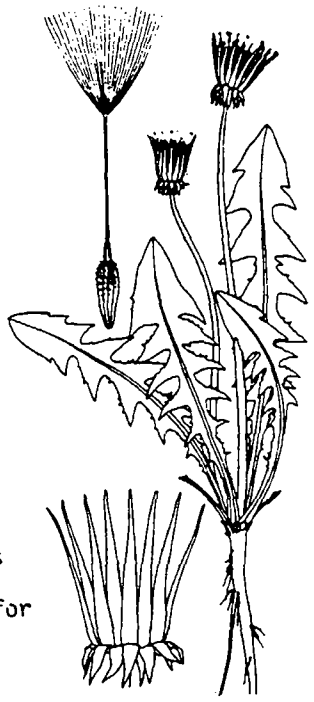


Stellaria jamesiana

Tuber Starwort

Indic: Moist to dry sites, prefers sandy or gravelly soils. Palatability fairly good for sheep, fair for cattle; flower heads taken.

Note: Tuberous root stocks when fresh and fleshy were important source of food for indians.



Taraxacum officinale

Common Dandelion

Indic: Present on dry to moist meadows; increases with heavy livestock use; moderately palatable.

Note: Leaves eaten raw or cooked but tend to be bitter, boil in 2 or more waters; roots edible raw or cooked, used for a tonic, mild laxative; wine made from flowers.

Trifolium longipes

Longstem Clover

Indic: Dry to moist meadows; occassionally in better condition scabland; decreases with heavy use; very palatable.

Note: Plants can be eaten raw; cause bloat in livestock if eaten in excess; tea from flower head.

Veratrum californicum

California Falsehellebore

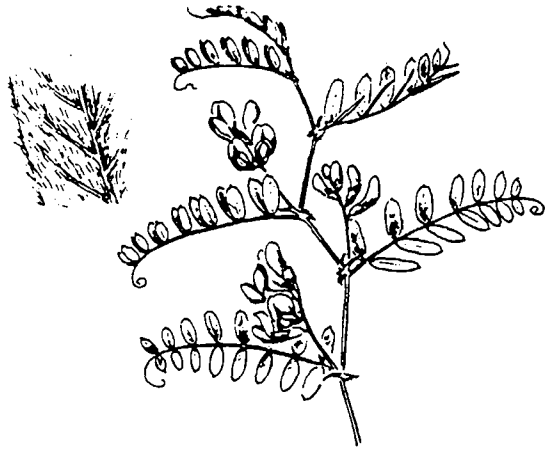
Indic: Moist soils in mountain regions; moist deep meadow soils to shallow coarse soils on moist or springy slopes. Invades and dominates highly disturbed areas. Palatability good for sheep, fair for cattle, poor for horses; contains a poisonous substance in root and young shoots but poison decreases as plant matures.

Note: Plant contains several poisonous alkaloids which can cause serious trouble when eaten in sufficient quantity.

Veronica peregrina

Speedwell

Indic: Moist or wet places, widespread in swales, wet meadows, or stream banks. Lowland to moderate elevation in mountains.



Vicia americana

American Vetch

Indic: Prefers rich, moist soil; good ponderosa pine and fir sites. High palatability, decreases with light to moderate grazing.

Note: Young stems and young seeds edible when boiled or baked.

Wyethia mollis

Wooly Wyethia

Indic: Well drained soils, exposed ridges, dry open slopes and flats in ponderosa pine types. Increaser on disturbed or overgrazed sites. Low palatability, flowerheads used by livestock and game animals.

Note: Roots and seeds used as food by indians.

APPENDIX

SUMMARY OF PRODUCTIVITY DATA: FORESTED TYPES

Plant Community \ Characteristic	Site Index[1] N[2]	SPP	Mean	E.05[3]	Range[4]	Total Basal Area N	Mean	E.05	Range	Growth Basal Area[5] N	Mean	E.05	Range	Productivity Index[6] (ft^3/A/yr) N	Mean	E.05	Range
White fir-ponderosa pine-sugar pine/manzanita (CW-C4-12)	9	PP	79	4	71-87	22	51	15	8-115	9	104	34	44-166	9	45	15	20-73
	6	WF	94	13	77-115	22	90	26	0-185	6	241	46	180-295	6	126	33	88-162
	5	SP	77	8	70-84	22	27	15	0-92	5	140	97	42-216	5	73	52	16-100
	2	IC	76	*	63-83	22	10	9	0-64	2	160	*	152-166	2	66	*	62-70
White fir-lodgepole pine/long-stolon sedge-needlegrass (CW-C3-11)	24	LP	67	3	52-85	30	121	24	15-260	24	121	25	27-254	24	45	10	11-102
	6	WF	77	5	68-82	30	47	28	0-230	6	207	102	114-334	6	88	43	49-138
Lodgepole pine/squirrel-tail-long-stolon sedge (CL-G4-15)	21	LP	66	4	48-82	21	131	9	94-166	21	79	11	34-127	21	29	5	12-48
Lodgepole pine/strawberry-fescue (CL-G3-15)	8	LP	73	7	62-89	8	149	36	122-250	8	135	23	83-164	8	54	10	40-71
		PP				8	6	*	0-26								
Lodgepole pine-quaking aspen/strawberry (CL-H1-11)	6	LP	79	10	67-88	6	203	76	118-334	6	180	69	98-281	6	77	25	45-104
Lodgepole pine-whitebark pine/gay penstemon (CL-C1-11)	16	LP	51	3	42-65	17	136	27	88-222	16	99	28	18-218	16	29	9	5-69
		WBP				17	12	6	0-38								

1/ Site index values are based on age 100 for all species. PP = ponderosa pine, WF = white fir, LP = lodgepole pine, SP = sugar pine, IC = incense cedar, WWP = western white pine, WBP = whitebark pine, QA = quaking aspen.

2/ N is the number of plots in the sample. Sample size is used to compute standard error and confidence intervals.

3/ E.05 is the 95% (or 5%) confidence interval (19 out of 20 samples lying between ±E.05 assuming a normal distribution).

4/ Range is the experienced variation in sample plot data.

5/ Growth basal area is that basal area at which crop trees grow at 1 inch diameter growth (10 20ths inch radius growth) in 10 years.

6/ Productivity index is calculated by SI/10 x GBA/10 x 0.55. The productivity index is based upon optimum stand management and should only be used as a relative index between communities listed.

* Data too variable to provide a reasonable estimate.

SUMMARY OF PRODUCTIVITY DATA: FORESTED TYPES

Plant Community \ Characteristic	Site Index[1]					Total Basal Area				Growth Basal Area[5]				Productivity Index[6] (ft^3/A/yr)			
	N[2]	SPP	Mean	E.05[3]	Range[4]	N	Mean	E.05	Range	N	Mean	E.05	Range	N	Mean	E.05	Range
Lodgepole pine-whitebark pine-western white pine/ sandwort (CL-C1-12)	10	LP	42	7	28-61	21	84	31	0-266	10	84	19	44-121	10	20	7	9-38
	4	WBP	35	12	28-42	21	18	13	0-90	4	71	65	20-114	4	15	*	3-26
	4	WWP	58	30	46-86	21	25	15	0-85	4	110	*	43-182	4	37	*	13-75
	3	WF	73	42	56-94	21	28	28	0-255	3	151	95	108-184	3	63	*	33-80
Ponderosa pine/wooly wyethia (CP-F1-11)	16	PP	78	4	68-88	16	148	23	93-288	16	100	23	38-192	16	44	11	15-89
Ponderosa pine/mountain big sagebrush/blue-grass (CP-S1-21)	14	PP	76	4	64-89	14	139	33	48-260	14	99	28	56-225	14	42	14	16-110
Ponderosa pine/bitter-brush/fescue (CP-S2-11)	23	PP	77	4	64-106	23	178	22	104-284	23	107	18	53-311	23	47	14	26-182
Ponderosa pine-juniper/ mountain-mahogany-bitter-brush-big sagebrush/ fescue (CP-C2-11)	13	PP	76	5	64-92	13	128	34	70-276	13	108	36	38-250	13	47	18	15-116
Ponderosa pine/bitter-brush-manzanita/fescue (CP-S2-17)	13	PP	77	3	67-86	13	167	24	106-244	13	126	19	74-210	13	54	9	30-89
Ponderosa pine-quaking aspen/bluegrass (CP-H3-11)	8	PP	78	6	66-89	8	165	44	94-244	8	124	39	72-230	8	55	21	26-113

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* Data too variable to provide a reasonable estimate.

SUMMARY OF PRODUCTIVITY DATA: FORESTED TYPES

Plant Community / Characteristic	Site Index[1] N[2]	Site Index SPP	Site Index Mean	Site Index E.05[3]	Site Index Range[4]	Total Basal Area N	Total Basal Area Mean	Total Basal Area E.05	Total Basal Area Range	Growth Basal Area[5] N	Growth Basal Area Mean	Growth Basal Area E.05	Growth Basal Area Range	Productivity Index[6] (ft^3/A/yr) N	Productivity Index Mean	Productivity Index E.05	Productivity Index Range
White fir-ponderosa pine/ snowberry/starwort (CW-S3-13)	69	PP	80	2	60-93	129	85	8	0-210	69	136	11	18-281	69	61	5	23-124
	59	WF	88	2	65-109	129	122	13	0-315	59	240	20	95-563	59	116	11	43-295
White fir-ponderosa pine-western white pine/ sticky currant (CW-C4-11)	11	WF	80	6	66-94	23	143	20	70-212	11	226	61	89-357	11	101	29	32-157
	7	WWP	73	11	63-99	23	48	19	0-132	7	206	83	55-310	7	95	32	19-139
	5	PP	71	8	66-79	23	34	17	0-110	5	196	72	133-271	5	78	33	49-115
White fir-ponderosa pine/ manzanita-oregon grape (CW-S1-17)	21	PP	80	3	66-90	28	92	13	20-152	21	103	18	44-191	21	46	9	17-97
	6	WF	93	10	78-101	28	61	25	0-246	5	250	85	170-386	5	131	51	73-202
White fir-ponderosa pine-incense cedar/service-berry (CW-C1-11)	24	PP	80	3	64-92	34	92	15	4-188	24	128	18	65-197	24	57	16	24-91
	10	WF	82	5	76-161	34	66	23	0-300	10	265	32	157-348	10	114	23	55-180
		IC				34	17	8	0-96								
White fir-ponderosa pine-quaking aspen/long-stolon sedge (CW-H2-11)	5	PP	78	22	47-90	6	122	55	32-156	5	136	51	59-202	5	59	31	35-98
		WF				6	21	18	4-48								
		QA				6	10	*	0-36								
		LP				6	25	*	0-92								

1/ Site index values are based on age 100 for all species. PP = ponderosa pine, WF = white fir, LP = lodgepole pine, SP = sugar pine, IC = incense cedar, WWP = western white pine, WBP = whitebark pine, QA = quaking aspen.

2/ N is the number of plots in the sample. Sample size is used to compute standard error and confidence intervals.

3/ E.05 is the 95% (or 5%) confidence interval (19 out of 20 samples lying between ±E.05 assuming a normal distribution).

4/ Range is the experienced variation in sample plot data.

5/ Growth basal area is that basal area at which crop trees grow at 1 inch diameter growth (10 20ths inch radius growth) in 10 years.

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* Data too variable to provide a reasonable estimate.

POTENTIAL RESPONSE OF SELECTED PLANTS TO FIRE

	LOW	A/ MOD.	HIGH	B/	C/	D/	E/	F/	G/ 0-1 yrs.	G/ 2-5 yrs.	G/ 6-10 yrs.
Ponderosa pine		X	X				X				X
White fir	X	X	X			X	X			X	
Douglas-fir		X	X							X	X
Lodgepole pine	X	X	X	X		X	X	X	X	X	X
Sugar pine		X	X			X					X
Incense cedar	X	X	X	X		X			X	X	
Mt. hemlock	X	X	X			X	X	X			X
Shasta red fir		X	X					X			X
Engelmann spruce		X	X			X			X	X	X
Western white pine		X	X			X				X	X
Western juniper	X	X	X			X			X	X	
Quaking aspen	X	X	X			X			X	X	X
Snowbrush				X	X				X	X	
Curlleaf mt. mahogany			X	X	X				X	X	
Chinquapin			X	X	X			X		X	
Squawcarpet		X	X		X	X				X	
Snowberry		X	X							X	X
Greenleaf manzanita		X	X	X	X				X		
Pinemat manzanita		X	X	X	X			X		X	
Bearberry		X	X								X
Bitterbrush		X	X	X	X					X	X
Gooseberries		X	X	X						X	X
Oregon grape		X	X						X	X	
Oregon boxwood		X	X			X					X
Big sagebrush		X	X						X	X	
Low sagebrush		X	X						X	X	X
Grouse huckleberry		X	X			X		X		X	X
Big huckleberry		X	X			X		X		X	X
Rabbitbrush		X	X						X	X	
Western needlegrass		X	X						X	X	X
Fescue			X						X	X	X
Ross' sedge			X						X	X	X
Long-stolon sedge			X					X	X	X	X
Prince's pine		X	X			X		X			X
Sidebells pyrola		X	X			X		X		X	X
Whitevein pyrola		X	X			X				X	X
Lupines		X	X						X	X	
Bottlebrush squirreltail		X	X						X	X	

A/ Probable death with varing intensities of fire; 1-6" class for trees.
B/ Species stimulated by fire.
C/ Species with long-lived dormant seeds deposited in the soil.
D/ Species easily killed by fire; 1-6" class for trees.
E/ Species with high degree of susceptibility to insect attack following fire.
F/ Species often associated with soils that can exhibit hydrophobic characteristics.
G/ Estimated rate of reestablishment following fire.

Revegetation Species Characterisitcs[1/]

Common Name	Scientific Name	Variety[2/]	Characteristics[3/]														
									Site Adaptation								
									Forested			Non Forested					
			Bunchgrass	Rhizomatous, Sod-former	Rapidity of Establishment	Drought tolerance	High water tolerance	Salinity tolerance	Dry	Moist	High Elevation	Dry	Moist	Wet	Palatability[4/]	Seeding rate (lbs/Acre)[5/]	Remarks
Bluegrass, Kentucky	*Poa prctensis*			X	2	1	1-2	3					X		1	6-10	must be grazed to retain vigor and production
Brome, California	*Bromus carinatus*		X		1	2	2	2		X	X		X		2	10-15	graze before maturity
Brome, mountain	*Bromus marginatus*	Bromar	X		1	2	2	2		X	X		X		2	10-15	graze before maturity
Brome, smooth	*Bromus inermis*	Manchar		X	1	2	2	2		X	X		X		2	10-15	highly competitive with trees and other herbaceous species
Canarygrass, reed	*Phalaris arundinacea*	Superior, Frontier		X	3	2	1	2					X	X	1-2	6-10	excellent for gully control and streambank maintenance
Fescue, hard	*Festuca ovina duriuscula*	Durar	X		2	1-2	3	2	X	X		X			1-2	6-10	low seed production, stand maintenance difficult; seed in mix
Fescue, tall	*Festuca arundinacea*	Alta, Fawn	X		3	2	1	1-2		X			X	X	1-2	8-14	graze in spring, fall, winter; seed in mix
Foxtail, meadow	*Alopecurus pratensis*			X	3	3	1	2		X			X	X	1	4-8	seed in mix

1/ Sources: Heath, Metcalfe, &Barnes(1973); Stoddart, Smith, &Box(1975); USDA, FS(1937); Vallentine(1971).
2/ Variety: where indicated the variety is specific for use in the Pacific Northwest.
3/ Symbols: 1 - good or fast; 2 - fair or moderate; 3 - poor or slow.
4/ Palatability: rating determined from literature and local livestock preference for species relative to other species present.
5/ Seeding rate: listed as pounds per acre for monoculture, seed in proportionately reduced amounts for mixture.

Revegetation Species Characterisitcs[1]

Common Name	Scientific Name	Variety[2]	Characteristics[3]														
									Site Adaptation								
									Forested			Non Forested					
			Bunchgrass	Rhizomatous, Sod-former	Rapidity of Establishment	Drought tolerance	High water tolerance	Salinity tolerance	Dry	Moist	High Elevation	Dry	Moist	Wet	Palatability[4]	Seeding rate (lbs/Acre)[5]	Remarks
Orchardgrass	*Dactylis glomerata*	Latar,Potomac	X		1	2	2	2	X	X	X		X		1	5-10	excellent seeded alone;high elev. seed with timothy & mountain brome
Redtop	*Agrostis alba*			X	2	3	1	2					X	X	1-2	6-10	seed in mix with timothy and legume; useful on wet,acid soils
Ricegrass, indian	*Oryzopsis hymenoides*		X		2-3	1	3	2				X			1	10-15	excellent winter feed
Rye, winter	*Secale cereale*		X		1-2	1-2	3	3	X				X		2	10-20	annual; seed in mix for soil stabilization on disturbed sites
Ryegrass, Italian	*Lolium multiflorum*		X		1	2-3	2	2	X	X	X		X		2	20-30	annual; seed in mix with longer lived perennials
Ryegrass, perennial	*Lolium perenne*		X		1	2-3	2	2	X	X	X		X		2	20-30	excellent quick ground cover; seed with longer lived perennials
Timothy	*Phleum pratense*	Climax, Drummond	X		1-2	3	2	2		X			X		1	4-8	seed in mix
Timothy, alpine	*Phleum alpinum*		X		1-2	3	2	2		X	X		X		1	4-8	high elevation, cold climate; seed in mix

1/ Sources: Heath,Metcalfe,&Barnes(1973); Stoddart,Smith,&Box(1975); USDA,FS(1937); Vallentine(1971).
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Revegetation Species Characterisitcs[1/]

Common Name	Scientific Name	Variety[2/]	Characteristics[3/]														
									Site Adaptation								
									Forested			Non Forested					
			Bunchgrass	Rhizomatous, Sod-former	Rapidity of Establishment	Drought tolerance	High water tolerance	Salinity tolerance	Dry	Moist	High Elevation	Dry	Moist	Wet	Palatability[4/]	Seeding rate (lbs/Acre)[5/]	Remarks
Wheat	*Triticum aestivum*		X		1-2	1-2	3	3	X				X		2	10-20	annual; seed in mix of perennials for rapid soil stabilization
Wheatgrass,intermediate	*Agropyron intermedium*	Greenar		X	1	2	2	3	X	X	X		X		1	10-15	highly competitive;rapid establishing;short lived
Wheatgrass,Fairway crested	*Agropyron cristatum*	Fairway	X		2	1	2-3	3	X		X	X			1	6-10	higher altitude, moister sites than standard crested wheatgrass
Wheatgrass,pubescent	*Agropyron trichophorum*	Topar		X	1	1-2	2	3	X	X	X		X		2	10-15	similar to intermediate wheatgrass, more drought tolerant
Wheatgrass,Siberian	*Agropyron sibiricum*	P-27	X		1-2	1	3	3	X			X			1	6-10	poorer, more adverse sites than standard crested wheatgrass
Wheatgrass,slender	*Agropyron caninum*	Primar	X		1	2	2	1		X	X		X		1	10-15	short-lived; seed in mix
Wheatgrass,standard crested	*Agropyron desertorum*	Nordan	X		1	1	3	3				X			1	6-10	early season, cold-hardy, drought tolerant species
Wheatgrass,streambank	*Agropyron riparium*	Sodar		X	1	1-2	1	3						X	2	8-12	excellent for streambank maintenance & wet site stabilization

1/ Sources: Heath,Metcalfe,&Barnes(1973); Stoddart,Smith,&Box(1975); USDA,FS(1937); Vallentine(1971).
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Revegetation Species Characterisitcs[1/]

Common Name	Scientific Name	Variety[2/]	Characteristics[3/]														
									Site Adaptation								
									Forested			Non Forested					
			Bunchgrass	Rhizomatous, Sod-former	Rapidity of Establishment	Drought tolerance	High water tolerance	Salinity tolerance	Dry	Moist	High Elevation	Dry	Moist	Wet	Palatability[4/]	Seeding rate (lbs/Acre)[5/]	Remarks
Wheatgrass, tall	*Agropyron elongatum*	Alkar	X		2	2	1	1		X			X	X	2	10-15	excellent for wet, saline or alkaline soils
Wheatgrass, thickspike	*Agropyron dasystachyum*	Critana		X	1	1	3	2	X						2	6-10	highly competitive species;good on roadsides & landings
Wheatgrass, western	*Agropyron smithii*	Mandan 456		X	3	1	1	1					X	X	1	10-15	excellent for erosion control and early season grazing
Wildrye, giant	*Elymus cinereus*	P-5797		X	2	3	2	2					X	X	2	10-20	good winter feed; seed in mix
Wildrye, Russian	*Elymus junceus*	Vinall,Sawki, Mayak	X		2	1	2	1	X	X			X		2	10-15	seed in mix
Alfalfa	*Medicago sativa*	Washoe,Ranger	X		1	1-2	2	2					X		1	6-12	seed in mix on fertile, moist soils
Sweetclover, yellow	*Melilotus officinalis*		X		1	1	2	2	X	X			X		1	10-15	tap-rooted biennial; outstanding soil improver; not acid tolerant
Trefoil, birdsfoot	*Lotus corniculatus*	Cascade	X		2	2	2	2	X	X			X		1	5-10	seed in mix with grass, good soi improver
Vetch, hairy	*Vicia villosa*	Oregon	X		1	2	2	2	X	X			X		1	8-12	seed in mix with grass

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